

WETLANDS OF CALIFORNIA, PART III: KEY TO AND
CATALOGUE OF WETLANDS OF THE CENTRAL AND
SOUTHERN CALIFORNIA COAST AND COASTAL
WATERSHEDS

WAYNE R. FERREN, JR.
Museum of Systematics and Ecology,
Department of Ecology, Evolution, and Marine Biology,
University of California, Santa Barbara 93106
ferren@lifesci.lscf.ucsb.edu

PEGGY L. FIEDLER
Department of Biology,
San Francisco State University,
San Francisco, CA 94132
fiedler@sfsu.edu

ROBERT A. LEIDY
U.S. Environmental Protection Agency, IX,
75 Hawthorne Street,
San Francisco, CA 94105
leidy.robert@epamail.epa.gov

KEVIN D. LAFFERTY
Department of Ecology, Evolution, and Marine Biology,
University of California, Santa Barbara 93106
lafferty@lifesci.lscf.ucsb.edu

LEAL A. K. MERTES
Department of Geography,
University of California, Santa Barbara 93106
leal@geog.ucsb.edu

ABSTRACT

Wetlands of the central and southern California coast and coastal watersheds belong to one of five major systems: marine, estuarine, riverine, lacustrine, or palustrine. A methodology for classifying these wetlands has been developed by Ferren et al. (1996b) as a modification of the Cowardin et al. (1979) approach. Use of this methodology during a three-year study resulted in the identification of wetlands from this region based on various abiotic and biotic descriptors and arranged in a hierarchical and numerical classification. Dichotomous keys to the higher classification rankings of system, subsystem, and class provide a way to access a catalogue of example wetland types and key additional wetlands.

The classification of wetlands of California has been evaluated (Ferren et al. 1996a) and a new classification methodology (Ferren

1989; Ferren et al. 1995, 1996b) has been proposed for use on wetlands of the central and southern California coast and coastal watersheds. This methodology is a modification of the Cowardin et al. (1979) approach, but includes a hierarchical, numerical approach that focuses on the richness of the region's physical attributes as well as its biological resources. One important addition in Ferren et al. (1996b) is a classification descriptor for hydrogeomorphic units that increases the usefulness of wetland identification because specific habitat information is included in the classification process and the wetland nomenclature.

Application of the Ferren et al. methodology has resulted in the compilation of a catalogue of wetlands from each of the five systems of wetlands and deepwater habitats (marine, estuarine, riverine, lacustrine, palustrine) that occur in the study region. This portion of California has been described in Ferren et al. (1996a, b) and extends from the Carmel River Watershed in Monterey County south to portions of the Tijuana River Watershed in San Diego County at the boundary with Mexico. The purpose of this third part of the three-part treatise by Ferren et al. is to demonstrate an application of the new classification technique. The study from which the field information was obtained was funded by the United States Environmental Protection Agency, Region IX, as part of a classification and inventory of the wetlands of the region.

In addition to the catalogue of wetlands, we also provide a key to the wetland systems, subsystems, and classes as a guide to the arrangement of the catalogue and as an approach to wetland identification to the class level that augments the classification methodology presented in Part II (Ferren et al. 1996b). A glossary to many of the terms used herein also is provided in Ferren et al. (1996b).

THE KEYS AND CATALOGUE

Keys to wetlands of the central and southern California coast and coastal watersheds are a modification of one developed by Cowardin et al. (1979) to accommodate the various abiotic and biota features of the region's wetland types. The keys (Appendix I) serve as a vehicle to: (1) locate in the catalogue (Appendix II) wetlands identified previously (see Ferren et al. 1996a, b); and (2) identify to class level additional wetlands observed in subsequent studies. The latter activity can be used in conjunction with the classification methodology presented in Ferren et al. (1996b).

The following steps provide access to the wetlands listed in the catalogue:

1. Use the "Key to the Wetland Systems" in Appendix I to determine the system of wetlands and deepwater habitats that (a) you desire to examine or (b) you want to identify.

2. Having completed the classification to a particular system, use the individual keys to classification rankings within each of the five systems to determine the subsystem and class of the wetland.
3. Once the class and subclass of a wetland have been determined, proceed to the appropriate portion of the catalogue (Appendix II) for the system, subsystem, class, and subclass within which you wish to locate an example wetland, or to which the classified wetland belongs.
4. Example wetlands occur within the ranking of subclass. All wetlands are organized according to strict numerical order, reflecting the various descriptor states derived from the classification tables provided in Part II (Ferren et al. 1996b).
5. For clarification on the nature of the five wetland systems, a brief discussion for each system precedes the listing of wetland types in the catalogue. Example wetland types also are illustrated (Figs. 1–7).

ACKNOWLEDGMENTS

We wish to thank Lewis Cowardin and his colleagues, Virginia Carter, Francis Golet, and Edward LaRoe, for providing a classification framework upon which we could build and consequently illustrate the great diversity of wetland types in California. We also extend our thanks to the Wetlands and Coastal Planning Section of the U.S. Environmental Protection Agency, Region IX, in San Francisco, California, for providing the funding for the initial proposal in 1991, and subsequent requests in 1992 and 1993. In particular, we thank Mary Butterwick, EPA Project Manager, for her interest in and enthusiasm for our project and for her patience during our effort to compile the draft report. We also thank Dr. James Kelley, Dean of the College of Science and Engineering at San Francisco State University, for providing matching release time for Peggy Fiedler; and we thank the Department of Ecology, Evolution, and Marine Biology of the University of California, Santa Barbara (UCSB) for assisting with the administration of this project. Extended additional thanks can be found in Part II of this treatise.

LITERATURE CITED

- BAILEY, R. G. 1978. Ecoregions of the United States. Intermountain Region, U.S. Forest Service, Ogden, UT.
- COWARDIN, L. M., V. CARTER, F. GOLET, and E. T. LAROE. 1979. Classification of wetlands and deepwater habitats of the United States. Office of Biological Services, U.S. Fish and Wildlife Service. FWS/OBS-79/31.
- FERREN, W. R., JR. 1989. A preliminary and partial classification of wetlands in southern and central California with emphasis on the Santa Barbara region. Prepared for: Wetland Plants and Vegetation of Coastal Southern California, A workshop organized for the California Department of Fish and Game and the U.S. Fish and Wildlife Service.
- FERREN, W. R., JR., P. L. FIEDLER, and R. A. LEIDY. 1995. Wetlands of the central and southern California coast and coastal watersheds: A methodology for their classification and description. Final report prepared for U.S. Environmental Protection Agency, Region IX, San Francisco, CA.
- FERREN, W. R., JR., P. L. FIEDLER, and R. A. LEIDY. 1995b. Palustrine Wetlands. *In* W. R. Ferren, Jr., P. L. Fiedler, and R. A. Leidy (eds.), loc. cit.

- FERREN, W. R., JR., P. L. FIEDLER, R. A. LEIDY, and K. D. LAFFERTY. 1995c. Estuarine Wetlands. *In* W. R. Ferren, Jr., P. L. Fiedler, and R. A. Leidy (eds.), loc. cit.
- FERREN, W. R., JR., P. L. FIEDLER, R. A. LEIDY, K. D. LAFFERTY, and LEAL A. K. MERTES. 1996a. Wetlands of California, Part I: Classification History. *Madroño* 43:105-124.
- FERREN, W. R., JR., P. L. FIEDLER, R. A. LEIDY, K. D. LAFFERTY, and LEAL A. K. MERTES. 1996b. Wetlands of California, Part II: Classification and description of wetlands of the central and southern California coast and coastal watersheds. *Madroño* 43:125-182.
- FIEDLER, P. L., W. R. FERREN, JR., AND R. A. LEIDY. 1995. Lacustrine Wetlands. *In* W. R. Ferren, Jr., P. L. Fiedler, and R. A. Leidy (eds.), loc. cit.
- LAFFERTY, K. D., KEITH D. HAMM, W. R. FERREN, JR., and P. L. FIEDLER. 1995. Marine Wetlands. *In* W. R. Ferren, Jr., P. L. Fiedler, and R. A. Leidy (eds.), loc. cit.
- LANGBEIN, W. B. AND K. T. ISERI. 1960. General introduction and hydrologic definitions manual of hydrology. U.S. Geol. Surv. Water Supply Paper 1541-A.
- LEIDY, R. A., W. R. FERREN, JR., and P. L. FIEDLER. 1995. Riverine Wetlands. *In* W. R. Ferren, Jr., P. L. Fiedler, and R. A. Leidy (eds.), loc. cit.

APPENDIX I: KEY TO THE WETLANDS

To facilitate the identification and classification of wetlands of the central and southern California coast and coastal watersheds, we have constructed dichotomous keys for the systems, subsystems and classes of wetlands. These keys are modifications of those presented by Cowardin et al. (1979). Keys to several subsystems that are deepwater habitats rather than wetlands are included for the purpose of comparison. Various classes for some systems are not included here because they do not occur in coastal central and southern California. Conversely, we have expanded the classification and accompanying keys when wetlands have been found to occur in California that are not represented in the Cowardin et al. hierarchy. Refer to "Wetlands of California, Part II" (Ferren et al. 1996b) for an explanation of the methodology used to identify wetlands listed herein.

KEY TO THE WETLAND SYSTEMS

- Water regime of habitats is influenced (at least one episode seasonally or enough to establish functions of system related habitats) by oceanic tides; salinity due to ocean-derived salts (i.e., ocean-derived sodium chloride) is 0.5 ppt (parts per thousand) or greater:
- Habitats are not obstructed, or have minor obstruction, to the open ocean; halinity (concentration of sodium chloride) usually euhaline or temporarily or seasonally less near the mouths of rivers. **MARINE SYSTEM (1)**
 - Habitats are semi-enclosed by land, but are open to, partly obstructed from, or have sporadic access to the ocean and oceanic tides; halinity can vary widely within or between examples because of evaporation or because of mixing with fresh water from runoff from land. **ESTUARINE SYSTEM (2)**
- Water regime is not influenced by oceanic tides, or if water regime is influenced by ocean tides the salinity is less than 0.5 ppt (i.e., the approximate background salinity of runoff from watersheds):
- Emergent mosses, persistent emergent vascular plants, shrubs, or trees cover 30% or more of the habitat; if nonpersistent emergents, other non-plant organisms, or no organisms dominate, the wetland is not a riverine nor a lacustrine habitat. **PALUSTRINE SYSTEM (5)**
 - Emergent mosses, persistent emergent vascular plants, shrubs, or trees cover less than 30% of the substrate, but nonpersistent emergents may be widespread seasonally:

- Habitat situated in a channel or along a channel shore; water when present is flowing (e.g., streams and rivers and the vegetation when present is non-persistent). **RIVERINE SYSTEM (3)**
- Habitat situated in a basin or on level but sloping ground; water when present is usually not flowing, but if in a channel the vegetation is persistent or nonpersistent:
- Habitat area is generally 8 hectares (20 acres) or greater (e.g., large lakes). **LACUSTRINE SYSTEM (4)**
- Habitat area is less than 8 hectares (e.g., ponds and pools):
- Waved-formed or bedrock-shoreline habitat feature is present, or water depth is 2 meters (6 feet) or greater at low water. **LACUSTRINE SYSTEM (4)**
- No wave-formed or bedrock-shoreline habitat feature is present, and water is less than 2 meters deep. **PALUSTRINE SYSTEM (5)**

1. KEY TO THE MARINE SUBSYSTEMS AND CLASSES

- Marine substrate is continuously submerged (i.e., subtidal habitats, which are not included in this volume). **DEEPWATER HABITAT SUBSYSTEM**
- During the growing season of most years, cover by vegetation is less than 30%:
- Substrate formed by the colonization of sedentary (i.e., attached) invertebrates (e.g., corals, tube worms). **REEF CLASS**
- Substrate composed of rock or sediment; often colonized by invertebrates but not formed of sedentary types:
- Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat. **ROCK BOTTOM CLASS**
- Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% areal cover of bedrock, boulders, or rubble. **UNCONSOLIDATED BOTTOM CLASS**
- During the growing season of most years, percentage of habitat covered by vegetation (e.g., algae and marine aquatic flowering plants such as *Zostera*) is 30% or greater. **AQUATIC BED CLASS**
- Marine substrate is at least irregularly exposed and flooded by oceanic tides, or receives wave splash. **INTERTIDAL SUBSYSTEM**
- During the growing season of most years, cover by vegetation (algae and marine flowering plants such as *Phyllospadix*) is greater than 30%. **AQUATIC BED CLASS**
- During the growing season of most years, cover by vegetation is less than 30%:
- Substrate is formed by the colonization of sedentary invertebrates (e.g., mussels). **REEF CLASS**
- Substrate composed of rock or sediment; often inhabited by invertebrates but not formed by the colonization of sedentary types:
- Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat. **ROCKY SHORE CLASS**
- Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% cover of bedrock, boulders, or rubble. **UNCONSOLIDATED SHORE CLASS**

2. KEY TO THE ESTUARINE SUBSYSTEMS AND CLASSES

- Estuarine substrate is continuously submerged (i.e., subtidal habitats, which are not included in this volume, except where emergent species dominate in subtidal channels). **DEEPWATER HABITAT SUBSYSTEM**
- During the growing season of most years, cover by vegetation is less than 30%:
- Substrate formed by the colonization of sedentary (i.e., attached) invertebrates (e.g., mussels, oysters). **REEF CLASS**
- Substrate composed of rock or sediment; often colonized by invertebrates but not formed of sedentary types:

- Substrate of bedrock, boulders, stones, or combinations of these covering 70% or more of the habitat. **ROCK BOTTOM CLASS**
- Substrate of organic material, mud, sand, gravel, or cobbles with less than 75% cover of bedrock, boulders, or rubble.
 **UNCONSOLIDATED BOTTOM CLASS**
- During the growing season of most years, percentage of habitat covered by vegetation (e.g., algae and estuarine aquatic flowering plants such as *Ruppia*) is 30% or greater. **AQUATIC BED CLASS**
- Estuarine substrate is at least irregularly exposed and flooded by oceanic tides.
 **INTERTIDAL SUBSYSTEM**
- During the growing season of most years, cover by vegetation is less than 30%:
 Substrate formed by the colonization of sedentary invertebrates (e.g., mussels).
 **REEF CLASS**
- Substrate composed of rock or sediment; often inhabited by invertebrates but not formed by the colonization of sedentary types:
 Habitat contained within a channel bed. **STREAMBED CLASS**
- Habitat along a shoreline:
 Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat. **ROCKY SHORE CLASS**
- Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% cover of bedrock, boulders, or rubble.
 **UNCONSOLIDATED SHORE CLASS**
- During the growing season of most years, percentage of area covered by vegetation (e.g., algae, aquatic and emergent vascular plants, or shrubs) is 30% or greater:
 Vegetation composed predominantly by macrophytic algae.
 **AQUATIC BED CLASS**
- Vegetation composed predominantly of vascular species:
 Vegetation herbaceous:
 Vegetation tidally-submerged rooted-aquatic, floating-leaved, or floating types (e.g., *Ruppia*, *Potamogeton*, *Lemna*). **AQUATIC BED CLASS**
- Vegetation emergent types:
 During the growing season of most years, the vegetation is composed largely of pioneering annuals and seedlings of perennials that occur at the time of substrate exposure:
 Vegetation occurs on unconsolidated bottom or bed habitats.
 **UNCONSOLIDATED BOTTOM (VEGETATED) CLASS**
- Vegetation occurs on unconsolidated shore or bank habitats.
 **UNCONSOLIDATED SHORE (VEGETATED) CLASS**
- During most years, the vegetation is composed largely of persistent species that dominant the substrate (e.g., *Salicornia*, *Scirpus*, *Spartina*).
 **EMERGENT WETLAND CLASS**

→

FIG. 1. Marine-Intertidal Rocky-Shore (Bedrock) Regularly-Flooded Euhaline Hogback-Ridge Wetland. Santa Barbara Co., Carpinteria view from Carpinteria Bluffs. Wetland Type No.: 11.141(13.4.362.2262).

FIG. 2. Estuarine-Intertidal Emergent-Persistent (*Scirpus americanus*) Irregularly-Exposed Mixohaline Low-Brackish Fringe-Marsh Wetland (left center). San Luis Obispo Co., Morro Bay, Los Osos, Los Osos Creek. View northward across Los Osos Creek toward brackish fringe-marsh in a low flooded area supported by a seep from adjacent palustrine forested wetland (left center) but flooded by tidal water irregularly. Wetland Type No.: 21.241(12.5.821/831.6231).



Vegetation shrubs or trees:

- Dominant plants less than 5 meters (15 feet) tall and composed of shrubs or stunted trees. SCRUB/SHRUB WETLAND CLASS
- Dominant plants 5 meters tall or taller (does not occur in Calif.). FORESTED WETLAND CLASS

3. KEY TO THE RIVERINE SUBSYSTEMS AND CLASSES

Water gradient is low and under the influence of oceanic tides (there are no examples of this subsystem in the study area, but there are in large river systems to the north). TIDAL SUBSYSTEM

Substrates are continuously submerged (i.e., subtidal habitats):

- During the growing season of most years, cover by vegetation is less than 30%:
 - Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat. ROCK BOTTOM CLASS
 - Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% cover of bedrock, boulders, or rubble. UNCONSOLIDATED BOTTOM CLASS

During the growing season of most years, percentage cover by vegetation (e.g., algae and submerged aquatic vascular plants such as *Potamogeton*, *Zannichellia*, *Elodea*) is 30% or greater. AQUATIC BED CLASS

Substrates are at least irregularly exposed and flooded by oceanic tides (i.e., intertidal habitats):

- During the growing season of most years, cover by vegetation is less than 30%:
 - Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the substrate. ROCKY SHORE CLASS
 - Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% cover of bedrock, boulders, or rubble. UNCONSOLIDATED SHORE CLASS

During the growing season of most years, percentage of area covered by herbaceous vegetation (e.g., algae, aquatic and emergent vascular plants) is 30% or greater:

- Vegetation tidally-submerged rooted aquatic, floating-leaved, or floating types (e.g., *Zannichellia*, *Najas*, *Lemna*). AQUATIC BED CLASS
- Vegetation intertidal, non-persistent emergent types (e.g., *Sagittaria*, *Isoetes*, *Elatine*). EMERGENT WETLAND CLASS

Water gradient is low, high, or intermittent, but there is no influence from oceanic tides:

Water flows in the channel for only part of the year; when water is not flowing surface water may be absent, or water may occur as isolated pools. INTERMITTENT SUBSYSTEMS

Channel occurs within a relatively high gradient (4–10%), where flows are often flashy and closely tied to specific rainfall events, and is entrenched with steep banks and poorly defined floodplains. UPPER INTERMITTENT SUBSYSTEM

During the growing season of most years, cover by vegetation is less than 30%. RIVERBED OR STREAMBED CLASS

During the growing season of most years, percentage of area covered by vegetation is 30% or greater, composed largely of pioneering annuals and seedlings of perennials that occur at the time of substrate exposure. RIVERBED OR STREAMBED (VEGETATED) CLASS

Channel occurs within a depositional landform, with a moderate gradient (1.5–4%) and low sinuosity, and is slightly entrenched. MID INTERMITTENT SUBSYSTEM

During the growing season of most years, cover by vegetation is less than 30%. RIVERBED OR STREAMBED CLASS

During the growing season of most years, cover by vegetation is 30% or greater, composed largely of pioneering annuals and seedlings of perennials that occur at the time of substrate exposure.

. RIVERBED OR STREAMBED (VEGETATED) CLASS

Channel occurs within a depositional landform with a low gradient (1.5% or less), where the floodplain is moderate to well developed, the valley only slightly confined, and the channel only slightly entrenched.

. **LOWER INTERMITTENT SUBSYSTEM**

During the growing season of most years, cover by vegetation is less than 30%.

. RIVERBED OR STREAMBED CLASS

During the growing season of most years, cover by vegetation is 30% or greater, composed largely of pioneering annuals and seedlings of perennials that occur at the time of substrate exposure.

. RIVERBED OR STREAMBED (VEGETATED) CLASS

Some water flows in the channel throughout the year.

. **PERENNIAL SUBSYSTEMS**

Channel gradient is high (4–10%) and water velocity is at least seasonally or temporarily fast; substrates consist of rock, cobbles, or gravel with patches of sand; a floodplain is usually lacking or poorly developed.

. **UPPER PERENNIAL SUBSYSTEM**

During the growing season of most years, cover by vegetation is less than 30%:

Water regimes include permanently or semi-permanently flooded and intermittently exposed; substrate is usually not a soil; bottoms and beds:

Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat.

. **ROCK BOTTOM CLASS**

Substrate of sand, gravel, or cobbles with less than 70% areal cover of bedrock, boulders, or rubble.

. **UNCONSOLIDATED BOTTOM CLASS**

Water regimes include seasonally flooded, temporarily flooded, intermittently flooded, saturated, or artificially flooded; shores and banks:

Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat.

. **ROCKY SHORE CLASS**

Substrate of sand, gravel, or cobble with less than 70% cover of bedrock, boulders, or rubble.

. **UNCONSOLIDATED SHORE CLASS**

During the growing season of most years, cover by herbaceous vegetation is 30% or greater:

Vegetation generally permanently-flooded algae, rooted aquatic, floating-leaved, or floating types.

. **AQUATIC BED CLASS**

Vegetation dominated by nonpersistent emergent types:

During the growing season of most years, vegetation is composed largely of nonpersistent pioneering annuals, nonpersistent perennials, and seedlings of perennials that occur at the time of substrate exposure:

Vegetation occurs on exposed, unconsolidated bottom or bed habitats.

. **UNCONSOLIDATED BOTTOM (VEGETATED) CLASS**

Vegetation occurs on exposed, unconsolidated shore or bank habitats.

. **UNCONSOLIDATED SHORE (VEGETATED) CLASS**

During most years, vegetation is composed largely of nonpersistent perennials that dominate the substrate or flooded riverine habitat.

. **EMERGENT WETLAND CLASS**

Channel gradient is moderate (1.5–4%) and sinuosity low, and occurs in a depositional and form; substrate is variable but dominated by cobbles, gravel, and sand.

. **MID PERENNIAL SUBSYSTEM**

During the growing season of most years, areal cover by vegetation is less than 30%:

Water regimes include permanently or semi-permanently flooded and intermittently exposed; substrate is usually not a soil; bottoms and beds:

- Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat. **ROCK BOTTOM CLASS**
- Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% cover of bedrock, boulders, or rubble.
. **UNCONSOLIDATED BOTTOM CLASS**
- Water regimes include seasonally flooded, temporarily flooded, intermittently flooded, saturated, or artificially flooded; shores or banks:
- Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat. **ROCKY SHORE CLASS**
- Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% cover of bedrock, boulders, or rubble.
. **UNCONSOLIDATED SHORE CLASS**
- During the growing season of most years, cover by herbaceous vegetation (e.g., algae, submerged aquatic and nonpersistent emergent vascular plants) is greater than 30%:
- Vegetation generally permanently-flooded algae, rooted aquatic, floating-leaved, or floating types (e.g., *Potamogeton*, *Lemna*).
. **AQUATIC BED CLASS**
- Vegetation dominated by nonpersistent emergent types:
- During the growing season of most years, vegetation is composed largely of nonpersistent pioneering annuals, nonpersistent perennials, and seedlings of perennials that occur at the time of substrate exposure:
- Vegetation occurs on exposed, unconsolidated bottom or bed habitats. **UNCONSOLIDATED BOTTOM (VEGETATED) CLASS**
- Vegetation occurs on exposed, unconsolidated shore or bank habitats. **UNCONSOLIDATED SHORE (VEGETATED) CLASS**
- During most years, vegetation is composed largely of nonpersistent perennials that dominate the substrate or flooded riverine habitat.
. **EMERGENT WETLAND CLASS**
- Channel gradient (1.5% or less) and water velocity are low; substrates are mostly sand and mud; a floodplain is often well developed.
. **LOWER PERENNIAL SUBSYSTEM**
- During the growing season of most years, cover by vegetation is less than 30%:
- Water regimes include permanently or semi-permanently flooded and intermittently exposed; substrate is usually not a soil; bottoms and beds:
- Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat. **ROCK BOTTOM CLASS**
- Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% cover of bedrock, boulders, or rubble.
. **UNCONSOLIDATED BOTTOM CLASS**
- Water regimes include seasonally flooded, temporarily flooded, intermittently flooded, saturated, or artificially flooded; shores and banks:
- Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat. **ROCKY SHORE CLASS**
- Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% cover of bedrock, boulders, or rubble.
. **UNCONSOLIDATED SHORE CLASS**

→

FIG. 3. Riverine Upper-Perennial Rock-Bottom (Boulder) Permanently-Flooded Montane-Stream-Channel Wetland. San Bernardino Co., San Bernardino National Forest, San Gorgonio District, Vivian Creek. View upstream. Wetland Type No.: 35.112(21.1.211.1500).



During the growing season of most years, cover by herbaceous vegetation (e.g., algae, submerged aquatic and nonpersistent emergent vascular plants) is greater than 30%:

Vegetation generally permanently-flooded algae, rooted aquatic, floating-leaved, or floating types (e.g., *Potamogeton*, *Lemna*). AQUATIC BED CLASS

Vegetation dominated by nonpersistent emergent types:

During the growing season of most years, vegetation is composed largely of nonpersistent pioneering annuals, nonpersistent perennials, and seedlings of perennials that occur at the time of substrate exposure:

Vegetation occurs on exposed, unconsolidated bottom or bed habitats. UNCONSOLIDATED BOTTOM (VEGETATED) CLASS

Vegetation occurs on exposed, unconsolidated shore or bank habitats. UNCONSOLIDATED SHORE (VEGETATED) CLASS

During most years, vegetation is composed largely of nonpersistent perennials that dominate the substrate or flooded riverine habitat.

. EMERGENT WETLAND CLASS

4. KEY TO THE LACUSTRINE SUBSYSTEMS AND CLASSES

All habitats (i.e., deepwater habitats) in a lake extending below a depth of 2 meters (6.6 feet) below low water or below the maximum extent of nonpersistent emergent plants, if these grow below 2 meters (all such habitats are excluded from this volume, but are included in the key for the purpose of comparison). LIMNETIC SUBSYSTEM

During the growing season of most years, cover by vegetation (i.e., submerged rooted-vascular, floating-leaved, and floating such as *Najas*, *Potamogeton*, *Myriophyllum*) is 30% or greater. AQUATIC BED CLASS

During the growing season of most years, cover by vegetation is less than 30%: Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat. ROCK BOTTOM CLASS

Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% areal cover of bedrock, boulders, or rubble. UNCONSOLIDATED BOTTOM CLASS

All habitats (i.e., wetlands) in a lake extending from the shoreline boundary of the system to a depth of 6 meters (6.6 feet) below low water or to the maximum extent of nonpersistent emergent plants, if these grow at depths greater than 2 meters. LITTORAL SUBSYSTEM

During the growing season of most years, cover by vegetation is less than 30%: Water regimes include permanently or semi-permanently flooded and intermittently exposed; substrate is usually not a soil:

Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat. ROCK BOTTOM CLASS

Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% cover of bedrock, boulders, or rubble. UNCONSOLIDATED BOTTOM CLASS

Water regimes include seasonally flooded, temporarily flooded, intermittently flooded, saturated, or artificially flooded:

Substrate of bedrock, boulders, rubble of combinations of these covering 70% or more of the habitat. ROCKY SHORE CLASS

Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% cover of bedrock, boulders, or rubble. UNCONSOLIDATED SHORE CLASS

During the growing season of most years, cover by herbaceous vegetation (e.g., algae, submerged aquatic and nonpersistent emergent vascular plants) is 30% or greater:

Vegetation generally consists of algae, submerged rooted aquatic, floating-leaved, or floating types (e.g., *Najas*, *Potamogeton*, *Myriophyllum*). . . .
 AQUATIC BED CLASS

Vegetation dominated by nonpersistent emergent types:

During the growing season of most years, vegetation is composed largely of nonpersistent pioneering annuals, nonpersistent perennials, and seedlings of perennials that occur at the time of substrate exposure:

Vegetation occurs on exposed, unconsolidated bottom or bed habitats. . . .
 UNCONSOLIDATED BOTTOM (VEGETATED) CLASS

Vegetation occurs on exposed, unconsolidated shore or bank habitats. . . .
 UNCONSOLIDATED SHORE (VEGETATED) CLASS

During most years, vegetation is composed largely of nonpersistent perennials that dominate the substrate or flooded littoral habitat.
 EMERGENT WETLAND CLASS

5. KEY TO THE PALUSTRINE CLASSES (there are no subsystems)

During the growing season of most years, cover by vegetation is less than 30%:

Water regimes include seasonally flooded, temporarily flooded, saturated, or artificially flooded; substrate is often a soil. . . . UNCONSOLIDATED SHORE CLASS

Water regimes include permanently or semipermanently flooded or intermittently exposed; substrate is usually not a soil:

Substrate of bedrock, boulders, rubble, or combinations of these covering 70% or more of the habitat. ROCK BOTTOM CLASS

Substrate of organic material, mud, sand, gravel, or cobbles with less than 70% cover of bedrock, boulders, or rubble.
 UNCONSOLIDATED BOTTOM CLASS

During the growing season of most years, cover by vegetation is 30% or greater:

Vegetation composed predominantly of nonvascular plants (e.g., algae or bryophytes):

Vegetation predominantly macrophytic algae, mosses, or lichens in water or the splash zones of shores. AQUATIC BED CLASS

Vegetation predominantly mosses or lichens usually growing on organic soils and always outside the splash zone of shores.
 MOSS-LICHEN WETLAND CLASS

Vegetation composed predominantly of vascular plant species:

Vegetation herbaceous:

Vegetation generally consists of submerged rooted aquatic, floating-leaved or floating types (e.g., *Najas*, *Potamogeton*, *Myriophyllum*).
 AQUATIC BED CLASS

Vegetation dominated by emergent types:

Vegetation composed of pioneering annuals, nonpersistent perennials, or seedlings of perennials that often are not hydrophytes and occur only at the time of substrate exposure:

Vegetation occurs on exposed, unconsolidated bottom or bed habitats.
 UNCONSOLIDATED BOTTOM (VEGETATED) CLASS

Vegetation occurs on exposed, unconsolidated shore or bank habitats.
 UNCONSOLIDATED SHORE (VEGETATED) CLASS

Vegetation predominantly perennials or nonpersistent hydrophyte species occurring in natural, restored, or recreated habitats.
 EMERGENT WETLAND CLASS

Vegetation shrubs or trees:

Dominant plants generally less than 5 meters (15 feet) tall.
 SCRUB-SHRUB WETLAND CLASS

Dominant plants generally 5 meters (15 feet) tall or taller.
 FORESTED WETLAND CLASS

APPENDIX II: CATALOGUE OF WETLAND TYPES

This catalogue includes example wetland types identified during the course of this study. The catalogue is arranged to the level of subclass. Within the subclasses, the wetlands are listed according to the hierarchical wetland type number. There was no attempt on the part of the authors to include all types of wetlands from each level of the hierarchy. Instead, we include examples of types from various classes, subclasses, water regimes, chemistry, hydrogeomorphic units, and dominance types. Examples of these wetlands are illustrated for each of the five wetland systems: Marine (Fig. 1, pg. 189), Estuarine (Fig. 2, pg. 189), Riverine (Fig. 3, pg. 193), Lacustrine (Fig. 4, pg. 197), and Palustrine (Figs. 5, pg. 197, 6, pg. 201, and 7, pg. 201).

1. MARINE WETLANDS

Marine wetlands of the study region occur within the Californian Marine and Estuary Province of North America, which extends from Mendocino County southward along the coast of Baja California, Mexico, and has a shoreline strongly influenced by coastal mountains and the coasts are rocky (Cowardin et al. 1979). In this province, freshwater is limited, the climate is Mediterranean and is influenced by the Humboldt Current, and the tidal range is moderate (Cowardin et al. 1979). Point Conception in Santa Barbara County is the demarcation between northern and southern California biogeographic areas that are reflected in the marine wetlands as well as the terrestrial flora and fauna (see Lafferty et al. 1995).

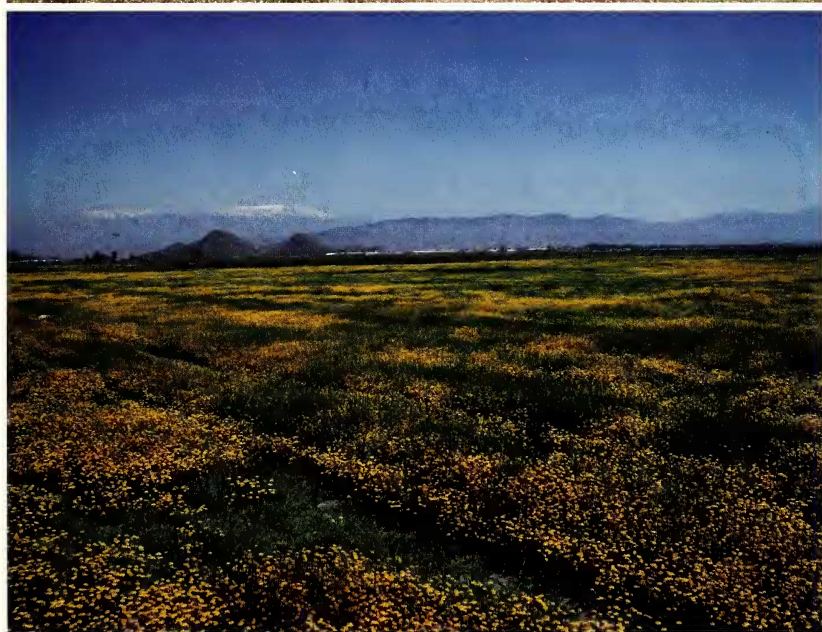
The coast of California extends along a linear length approximately 1100 miles. Although the study region covers about 400 linear miles of coastline, it is longer and richer in marine wetland types because of its fractal character. This length is studded with a rich abundance and diversity of physical attributes, renown in their scenic beauty, and unique in geologic origin. It is home to a varied and fascinating assemblage of plants and animals.

The Marine System (System No. 10.000) includes two subsystems: (1) Subsystem Intertidal (i.e., wetlands; No. 11.000); and (2) Subsystem Subtidal (i.e., deepwater habitats; No. 12.000). Cowardin et al. (1979, p. 4) define the system as follows:

→

FIG. 4. Lacustrine-Littoral Unconsolidated-Shore-Vegetated (Mixed-Fines, Mixed Vascular-Plants) Seasonally-Flooded Montane-Reservoir-Shore Wetland. San Bernardino Co., San Bernardino Mountains, Big Bear Lake, Grout Bay. View northeastward from unconsolidated-shore (sand and mixed-fines) dominated by nonpersistent emergent vegetation to intermittently-exposed and permanently-flooded unconsolidated-bottom habitats. Wetland Type No.: 41.155(24.1.334.1700,7000).

FIG. 5. Palustrine Emergent-Nonpersistent (*Lasthenia californica*) Seasonally-Flooded Alkali Vernal-Plain Wetland. Riverside Co., Old Salt Creek Drainage west of Hemet, Florida Ave. and Warren Rd. View across extensive vernal plain, eastward toward the San Jacinto Mountains. Small basins forming vernal pools with different dominance types occur throughout the plain. As shown here, the disked, desiccated plain is dominated by *Lasthenia californica*, but may appear with different dominant plant species depending on the time of year, amount of rainfall in a particular year, proximity to local vernal pool areas, and degree of disturbance. Wetland Type No.: 50.242(24.3.523.5532).



The Marine System . . . consists of the open ocean overlying the continental shelf and its associated high-energy coastline. Marine habitats are exposed to the waves and currents of the open ocean and the water regimes are determined primarily by the ebb and flow of oceanic tides. Salinities exceed 30 ppt [parts per thousand], with little or no dilution except outside the mouths of estuaries. Shallow coastal indentations or bays without appreciable freshwater inflow, and coasts with exposed rocky islands that provide the mainland with little or no shelter from wind and waves, are also considered part of the Marine System because they generally support typical marine biota.

Cowardin et al. (1979) also have provided a description of the limits of this system. As a general rule, the Marine System extends from the outer edge of the continental shelf (=deepwater habitat) to one of several possible shoreline features. These features include the landward limit of tidal inundation defined as the extreme high water of spring tides (including the splash zone from breaking waves); the seaward limit of wetland emergents, shrubs, or trees; and the seaward limit of the Estuarine System.

10.000 SYSTEM MARINE

11.000 SUBSYSTEM INTERTIDAL

11.140 CLASS ROCKY-SHORE

11.141 SUBCLASS BEDROCK

Wetland Type No.: 11.141(12.4.181.2472)

MARINE-INTERTIDAL ROCKY-SHORE (BEDROCK) IRREGULARLY-EXPOSED LARGE-TIDE-POOL WETLAND. San Diego Co., Ocean Beach, Sunset Cliffs Park on Sunset Cliffs Blvd. at Ladera St.

Wetland Type No.: 11.141(12.4.182.2472)

MARINE-INTERTIDAL ROCKY-SHORE (BEDROCK) IRREGULARLY-EXPOSED SMALL-TIDE-POOL WETLAND. San Diego Co., Ocean Beach, Sunset Cliffs Park on Sunset Cliffs Blvd. at Ladera St.

Wetland Type No.: 11.141(13.4.211.2472)

MARINE-INTERTIDAL ROCKY-SHORE (BEDROCK) REGULARLY-FLOODED LARGE-SURGE-CHANNEL WETLAND. Los Angeles Co., Palos Verdes Peninsula, San Pedro, White Point, end of Kay Fiorentino Dr.

Wetland Type No.: 11.141(13.4.261.2472)

MARINE-INTERTIDAL ROCKY-SHORE (BEDROCK) REGULARLY-FLOODED LARGE-FISSURE WETLAND. Los Angeles Co., Palos Verdes Peninsula, San Pedro, White Point, end of Kay Fiorentino Dr.

Wetland Type No.: 11.141(13.4.271.2472)

MARINE-INTERTIDAL ROCKY-SHORE (BEDROCK) REGULARLY-FLOODED LARGE-SEA-CAVE WETLAND. Santa Barbara Co., north side of Santa Cruz Island, Painted Cave.

Wetland Type No.: 11.141(13.4.341.8212)

MARINE-INTERTIDAL ROCKY-SHORE (BEDROCK) REGULARLY-FLOODED OCEAN-BENCH WETLAND. Ventura Co., Point Mugu State Park, Sycamore Cove, 9000 Pacific Coast Highway.

Wetland Type No.: 11.141(13.4.341.8331)

MARINE-INTERTIDAL ROCKY-SHORE (BEDROCK) REGULARLY-FLOODED OCEAN-BENCH WETLAND. Santa Barbara Co., Carpinteria, Chevron Pt.

Wetland Type No.: 11.141(13.4.342.2262)

MARINE-INTERTIDAL ROCKY-SHORE (BEDROCK) REGULARLY-

FLOODED EXPOSED-BAY-BENCH WETLAND. Santa Barbara Co., Goleta, UCSB, between Campus Point and Goleta Pier.

Wetland Type No.: 11.141(13.4.361.8524)

MARINE-INTERTIDAL ROCKY-SHORE (BEDROCK) REGULARLY-FLOODED LEDGE WETLAND. Los Angeles Co., Malibu, Leo Carrillo State Beach, 36000 Pacific Coast Hwy.

Wetland Type No.: 11.141(13.4.362.2262)

MARINE-INTERTIDAL ROCKY-SHORE (BEDROCK) REGULARLY-FLOODED HOGBACK-RIDGE WETLAND. Santa Barbara Co., Carpinteria Bluffs. (Fig. 1, pg. 189).

Wetland Type No.: 11.141(13.4.441.1200)

MARINE-INTERTIDAL ROCKY-SHORE (BEDROCK) REGULARLY-FLOODED LARGE-SEA-STACK WETLAND. Santa Barbara Co., south side of Santa Cruz Island, Willows Anchorage.

Wetland Type No.: 11.141(13.4.611.1300)

MARINE-INTERTIDAL ROCKY-SHORE (BEDROCK) REGULARLY-FLOODED LARGE-HEADLAND WETLAND. Los Angeles Co., Palos Verdes Peninsula, Resort Point.

Wetland Type No.: 11.141(13.4.612.1200)

MARINE-INTERTIDAL ROCKY-SHORE (BEDROCK) REGULARLY-FLOODED SMALL-HEADLAND WETLAND. Santa Barbara Co., Goleta, east of Goleta Pier.

Wetland Type No.: 11.141(13.4.621.1200)

MARINE-INTERTIDAL ROCKY-SHORE (BEDROCK) REGULARLY-FLOODED CLIFF WETLAND. Ventura Co., East Anacapa Island.

Wetland Type No.: 11.141(13.4.912.1200)

MARINE-INTERTIDAL ROCKY-SHORE (BEDROCK) REGULARLY-FLOODED SEA-WALL WETLAND. San Diego Co., La Jolla, Marine Room, south of La Jolla Shores Beach.

Wetland Type No.: 11.141(13.4.912.2262)

MARINE-INTERTIDAL ROCKY-SHORE (BEDROCK) REGULARLY-FLOODED SEA-WALL WETLAND. Ventura Co., southeast from Faria County Park, Solimar Beach.

Wetland Type No.: 11.141(13.4.916.8331)

MARINE-INTERTIDAL ROCKY-SHORE (BEDROCK) REGULARLY-FLOODED PILING WETLAND. Orange Co., South Laguna, 31000 block of Pacific Coast Hwy., Aliso Pier.

Wetland Type No.: 11.141(14.4.451.1200)

MARINE-INTERTIDAL ROCKY-SHORE (BEDROCK) IRREGULARLY-FLOODED LARGE-ISLET WETLAND. San Diego Co., Ocean Beach, on Sunset Cliffs Blvd. between Point Loma Ave. and Ladera St.

Wetland Type No.: 11.141(14.4.452.1200)

MARINE-INTERTIDAL ROCKY-SHORE (BEDROCK) IRREGULARLY-FLOODED SMALL-ISLET WETLAND. Santa Barbara Co., Goleta, More Mesa Beach.

10.000 SYSTEM MARINE
11.000 SUBSYSTEM INTERTIDAL
11.140 CLASS ROCKY-SHORE
11.142 SUBCLASS RUBBLE

Wetland Type No.: 11.142(12.4.161.1100)

MARINE-INTERTIDAL ROCKY-SHORE (RUBBLE) IRREGULARLY-EXPOSED LARGE-PORT WETLAND. Ventura Co., Port Hueneme, W. end of Hueneme Rd.

Wetland Type No.: 11.142(12.4.161.1100)

MARINE-INTERTIDAL ROCKY-SHORE (RUBBLE) IRREGULARLY-EXPOSED LARGE-HARBOR WETLAND. Orange Co., Dana Point, off Pacific Coast Hwy., 7.5 mi. S.E. of Laguna Beach.

Wetland Type No.: 11.142(12.4.311.2231)

MARINE-INTERTIDAL ROCKY-SHORE (RUBBLE) IRREGULARLY-EXPOSED OCEAN-SHORE WETLAND. Ventura Co., Old Pacific Coast Hwy. at Hwy. 101, Emma Wood State Beach.

Wetland Type No.: 11.142(13.4.920.1300)

MARINE-INTERTIDAL ROCKY-SHORE (RUBBLE) REGULARLY-FLOODED SEA-WALL WETLAND. Santa Barbara Co., Carpinteria, foot of Ash Ave., Carpinteria Beach.

* * * *

10.000 SYSTEM MARINE
11.000 SUBSYSTEM INTERTIDAL
11.150 CLASS UNCONSOLIDATED-SHORE
11.151 SUBCLASS COBBLE-GRAVEL

Wetland Type No.: 11.151(12.4.311.2231)

MARINE-INTERTIDAL UNCONSOLIDATED-SHORE (COBBLE-GRAVEL) IRREGULARLY-EXPOSED OCEAN-SHORE WETLAND. Ventura Co., off old Pacific Coast Hwy., just south of Seacliff, Hobson County Park.

Wetland Type No.: 11.151(13.4.311.1400)

MARINE-INTERTIDAL UNCONSOLIDATED-SHORE (COBBLE-GRAVEL) REGULARLY-EXPOSED OCEAN-SHORE WETLAND. San Diego Co., Carlsbad, West of Batiquitos Lagoon, South Carlsbad State Beach.

* * * *

→

FIG. 6. Palustrine Scrub-Shrub Broadleaved-Evergreen (*Pluchea sericea*) Phreatophytic River-Terrace Wetland. San Luis Obispo Co., Cuyama River Valley. View southeastward across terrace and adjacent river-channel toward the Sierra Madre Mountains. *Pluchea sericea* forms an extensive scrub-shrub wetland on alluvial soils deposited in the lower valley, up-river from the Cuyama River Gorge. Wetland Type No.: 50.253(29.1.561.5627).

FIG. 7. Palustrine Forested Broadleaved-Evergreen (*Myrica californica*) Permanently-Saturated Slope-Seep Wetland. San Luis Obispo Co., Morro Bay, Los Osos Creek, Los Osos. View southeastward across estuarine salt-marsh (foreground) dominated by *Salicornia virginica* and estuarine brackish-marsh (center and right) dominated by *Juncus acutus*, toward a headland slope-seep dominated by *Myrica californica* (Wax Myrtle), upper right. Wetland No.: 50.263(25.1.712.5952).



10.000 SYSTEM MARINE
11.000 SUBSYSTEM INTERTIDAL
11.150 CLASS UNCONSOLIDATED-SHORE
11.152 SUBCLASS SAND

Wetland Type No.: 11.152(13.4.321.1600)

MARINE-INTERTIDAL UNCONSOLIDATED-SHORE (SAND) REGULARLY-FLOODED OCEAN-BEACH WETLAND. Monterey Co., Big Sur Coast, off Hwy. 1, 21 mi. S. of Carmel, Andre Molera State Park.

Wetland Type No.: 11.152(13.4.322.1600)

MARINE-INTERTIDAL UNCONSOLIDATED-SHORE (SAND) REGULARLY-FLOODED EXPOSED-BAY-BEACH. Santa Barbara Co., Goleta, UCSB.

Wetland Type No.: 11.152(13.4.324.1600)

MARINE-INTERTIDAL UNCONSOLIDATED-SHORE (SAND) REGULARLY-FLOODED COVE-BEACH WETLAND. San Diego Co., La Jolla, along Coast Blvd., Children's Pool.

Wetland Type No.: 11.152(13.4.324.1600)

MARINE-INTERTIDAL UNCONSOLIDATED-SHORE (SAND) REGULARLY-FLOODED COVE-BEACH WETLAND. Monterey Co., Big Sur, end of Sycamore Canyon Rd., Pfeiffer Beach.

* * * *

10.000 SYSTEM MARINE
11.000 SUBSYSTEM INTERTIDAL
11.150 CLASS UNCONSOLIDATED-SHORE
11.153 SUBCLASS MUD

Wetland Type No.: 11.153(12.4.151.1800,2262)

MARINE-INTERTIDAL UNCONSOLIDATED-SHORE (MUD) IRREGULARLY-EXPOSED LAGOON WETLAND. Santa Barbara Co., Goleta, UCSB, Campus Point. The input for this lagoon is the outfall from the UCSB marine lab.

* * * *

10.000 SYSTEM MARINE
11.000 SUBSYSTEM INTERTIDAL
11.210 CLASS AQUATIC BED
11.211 SUBCLASS ATTACHED ALGAL

Wetland Type No.: 11.211(13.4.311.2323)

MARINE-INTERTIDAL AQUATIC-BED-ATTACHED-ALGAL (*FUCUS DISTICHUS*) REGULARLY-FLOODED OCEAN-SHORE WETLAND. San Luis Obispo Co., Hearst State Beach, overlook north of San Simeon Point along Hwy. 1.

* * * *

10.000 SYSTEM MARINE
11.000 SUBSYSTEM INTERTIDAL
11.210 CLASS AQUATIC BED
11.214 SUBCLASS ROOTED VASCULAR

Wetland Type No.: 11.214(12.4.521.6142)

MARINE-INTERTIDAL AQUATIC-BED-ROOTED-VASCULAR (*PHYLLOSPADIX TORREYI*) IRREGULARLY-EXPOSED DELTA WETLAND. Ventura Co., S.E. of Hwy. 101 at Hwy. 33, Ventura River Delta.

2. ESTUARINE WETLANDS

Estuaries of the study region occur within the Californian Marine and Estuarine Province of North America, which extends from Mendocino County southward along the coast of Baja California, Mexico, and has a shoreline strongly influenced by coastal mountains, and the coasts are rocky (Cowardin et al. 1979). In this province, freshwater is limited, the climate is Mediterranean and is influenced by the Humboldt Current, and the tidal range is moderate (Cowardin et al. 1979). The study region covers approximately 400 miles of this coastline and includes numerous estuaries among several major types, many of which have been studied or visited during the course of this project (see Ferren et al. 1995b).

The Estuarine System (System No. 20.000) includes two subsystems: (1) Subsystem Intertidal (i.e., wetlands; No. 21.000); and (2) Subsystem Subtidal (i.e., deepwater habitats; No. 22.000). Cowardin et al. (1979) define the system as follows:

The Estuarine System . . . consists of deepwater tidal habitats and adjacent tidal wetlands that are usually semienclosed by land but have open, partly obstructed, or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Offshore areas with typical estuarine plants and animals, such as mangroves . . . and eastern oysters . . . are also included in the Estuarine System.

Cowardin et al. also have provided a description of the limits of this system, including three main features: (1) the Estuarine System extends upstream or toward land to the area where salinity from ocean-derived salts (i.e., largely sodium chloride) is less than 0.5 ppt (parts per thousand) during the average annual low flow of freshwater input; (2) downstream to an imaginary line that closes the mouth of an estuary (e.g., a river, bay, or sound); and (3) extending to the seaward limit of estuarine vegetation dominated by emergents, shrubs, or trees and to the seaward limit of offshore areas continuously diluted by runoff to salinities less than those of the Marine System.

20.000 SYSTEM ESTUARINE

21.000 SUBSYSTEM INTERTIDAL

21.110 CLASS ROCK-BOTTOM

21.112 SUBCLASS RUBBLE-BOULDER

* * * *

20.000 SYSTEM ESTUARINE

21.000 SUBSYSTEM INTERTIDAL

21.120 CLASS UNCONSOLIDATED-BOTTOM

21.121 SUBCLASS COBBLE-GRAVEL

* * * *

20.000 SYSTEM ESTUARINE

21.000 SUBSYSTEM INTERTIDAL

21.120 CLASS UNCONSOLIDATED-BOTTOM

21.122 SUBCLASS SAND

Wetland Type No.: 21.122(13.5.224.8342, 8346)

ESTUARINE-INTERTIDAL UNCONSOLIDATED-BOTTOM (SAND) REGU-

LARLY-FLOODED MIXOHALINE SHALLOW-ARTIFICIAL ESTUARINE-CHANNEL WETLAND. Santa Barbara Co., Carpinteria Valley, Carpinteria Salt Marsh Reserve.

Wetland Type No.: 21.122(13.5.422.1600)

ESTUARINE-INTERTIDAL UNCONSOLIDATED-BOTTOM (SAND) REGULARLY-FLOODED MIXOHALINE SHALLOW-BAR WETLAND. San Diego Co., Del Mar, San Dieguito Lagoon.

* * * *

20.000 SYSTEM ESTUARINE

21.000 SUBSYSTEM INTERTIDAL

21.120 CLASS UNCONSOLIDATED-BOTTOM

21.123 SUBCLASS MUD

Wetland Type No.: 21.123(12.4.412.1800)

ESTUARINE-INTERTIDAL UNCONSOLIDATED-BOTTOM (MUD) IRREGULARLY-EXPOSED EUHALINE SHALLOW-BOTTOM WETLAND. San Luis Obispo Co., Morro Bay, Baywood Park, Sweetwater Springs Reserve.

Wetland Type No.: 21.123(13.4.412.1800)

ESTUARINE-INTERTIDAL UNCONSOLIDATED-BOTTOM (MUD) REGULARLY-FLOODED EUHALINE SHALLOW-BOTTOM WETLAND. Orange Co., Newport Backbay.

Wetland Type No.: 21.123(13.5.224.1700, 2110, 2200, 8311)

ESTUARINE-INTERTIDAL UNCONSOLIDATED-BOTTOM (MUD) REGULARLY-FLOODED MIXOHALINE SHALLOW-ARTIFICIAL ESTUARINE-CHANNEL WETLAND. Santa Barbara Co., Carpinteria Valley, Carpinteria Salt Marsh Reserve. Dominance or characteristic types include diatoms, green algae, and the gastropod *Cerithidea*.

Wetland Type No.: 21.123(13.5.256.1800)

ESTUARINE UNCONSOLIDATED-BOTTOM (MUD) REGULARLY-FLOODED MIXOHALINE SMALL-TIDAL-MARSH CHANNEL WETLAND. Ventura Co., Point Mugu Pacific Naval Air Station, Mugu Lagoon.

Wetland Type No.: 21.123(13.5.511.1800, 2200,8311)

ESTUARINE-INTERTIDAL UNCONSOLIDATED-BOTTOM (GREEN-ALGAE, *CERITHIDEA*) REGULARLY-FLOODED MIXOHALINE MUD-FLAT WETLAND. San Diego Co., Imperial Beach, Tijuana Estuary, Tijuana River National Estuarine Research Reserve.

Wetland Type No.: 21.123(14.7.512.1700)

ESTUARINE-INTERTIDAL UNCONSOLIDATED-BOTTOM (MIXED-FINE) IRREGULARLY-FLOODED HYPERSALINE SALT-FLAT WETLAND. San Diego Co., Camp Pendleton, San Margarita River Estuary.

* * * *

20.000 SYSTEM ESTUARINE

21.000 SUBSYSTEM INTERTIDAL

21.140 CLASS ROCKY-SHORE

21.142 SUBCLASS RUBBLE-BOULDER

Wetland Type No.: 21.142(14.5.912.1300)

ESTUARINE-INTERTIDAL ROCKY-SHORE (RUBBLE) IRREGULARLY-FLOODED MIXOHALINE REVETMENT WETLAND. San Diego Co., Del Mar, San Dieguito Lagoon.

* * * *

20.000 SYSTEM ESTUARINE
21.000 SUBSYSTEM INTERTIDAL
21.150 CLASS UNCONSOLIDATED-SHORE
21.151 SUBCLASS COBBLE-GRAVEL

Wetland Type No.: 21.151(13.5.252.1500,1600)
ESTUARINE-INTERTIDAL UNCONSOLIDATED-SHORE (MIXED-COARSE AND SAND) REGULARLY-FLOODED MIXOHALINE LARGE TIDAL-MARSH-CHANNEL WETLAND. San Diego Co., Imperial Beach, Tijuana River Estuary, Tijuana River National Estuarine Research Reserve.

* * * *

20.000 SYSTEM ESTUARINE
21.000 SUBSYSTEM INTERTIDAL
21.150 CLASS UNCONSOLIDATED-SHORE
21.152 SUBCLASS SAND

Wetland Type No.: 21.152(13.5.313.1600)
ESTUARINE-INTERTIDAL UNCONSOLIDATED-SHORE (SAND) REGULARLY-FLOODED MIXOHALINE ESTUARY-SHORE WETLAND. Monterey Co., Andrew Molera State Park, Big Sur River Estuary.

Wetland Type No.: 21.152(13.5.323.1600)
ESTUARINE-INTERTIDAL UNCONSOLIDATED-SHORE (SAND) REGULARLY-FLOODED MIXOHALINE ESTUARY-BEACH WETLAND. Monterey Co., Andrew Molera State Park, Big Sur River Estuary.

Wetland Type No.: 21.152(13.4.323.1600)
ESTUARINE-INTERTIDAL UNCONSOLIDATED-SHORE (SAND) REGULARLY-FLOODED HALINE ESTUARY-BEACH WETLAND. Los Angeles Co., Malibu, Malibu Lagoon.

* * * *

20.000 SYSTEM ESTUARINE
21.000 SUBSYSTEM INTERTIDAL
21.150 CLASS UNCONSOLIDATED-SHORE
21.153 SUBCLASS MUD

Wetland Type No.: 21.153(14.7.512.8640)
ESTUARINE-INTERTIDAL UNCONSOLIDATED-SHORE (MUD) IRREGULARLY-FLOODED HYPERSALINE SALT-FLAT WETLAND. Santa Barbara Co., Carpinteria Valley, Carpinteria Salt Marsh, Carpinteria Salt Marsh Reserve.

* * * *

20.000 SYSTEM ESTUARINE
21.000 SUBSYSTEM INTERTIDAL
21.220 CLASS AQUATIC-BED
21.211 SUBCLASS ATTACHED-ALGAL

Wetland Type No.: 21.211(14.6.513.2600)
ESTUARINE-INTERTIDAL AQUATIC-BED ATTACHED-ALGAL (BLUE-GREEN ALGAE) IRREGULARLY-FLOODED EURYHALINE VEGETATED-FLAT WETLAND. Santa Barbara Co., Carpinteria Valley, Carpinteria Salt Marsh Reserve.

* * * *

20.000 SYSTEM ESTUARINE
21.000 SUBSYSTEM INTERTIDAL
21.220 CLASS AQUATIC-BED

21.212 SUBCLASS FLOATING-ALGAL

Wetland Type No.: 21.212(13.5.224.2262)

ESTUARINE-INTERTIDAL AQUATIC-BED FLOATING-ALGAL (*ENTEROMORPHA*) REGULARLY-FLOODED MIXOHALINE SHALLOW-ARTIFICIAL ESTUARY-CHANNEL WETLAND. Santa Barbara Co., Carpinteria Valley, Carpinteria Salt Marsh Reserve.

* * * *

20.000 SYSTEM ESTUARINE
21.000 SUBSYSTEM INTERTIDAL
21.210 CLASS AQUATIC-BED

21.214 SUBCLASS ROOTED-VASCULAR

Wetland Type No.: 21.214(12.4.412.6143)

ESTUARINE-INTERTIDAL AQUATIC-BED ROOTED-VASCULAR (*ZOSTERA MARINA*) IRREGULARLY-EXPOSED EUHALINE SHALLOW-BOTTOM WETLAND (lower-center). San Luis Obispo Co., Morro Bay, Baywood Park, Sweetwater Springs Reserve.

Wetland Type No.: 21.214(12.5.172.6122)

ESTUARINE-INTERTIDAL AQUATIC-BED ROOTED-VASCULAR (*RUPPIA CIRRHOSA*) IRREGULARLY-EXPOSED MIXOHALINE TIDAL-MARSH-POND WETLAND. San Diego Co., Del Mar, San Dieguito Lagoon.

Wetland Type No.: 21.214(12.5.222.6122)

ESTUARINE-INTERTIDAL AQUATIC-BED ROOTED-VASCULAR (*RUPPIA CIRRHOSA*) IRREGULARLY-EXPOSED MIXOHALINE SHALLOW-NATURAL-CHANNEL WETLAND. Santa Barbara Co., Hollister Ranch, Santa Anita Estuary.

Wetland Type No.: 21.214(15.6.412.6123)

ESTUARINE-INTERTIDAL AQUATIC-BED ROOTED-VASCULAR (*RUPPIA MARITIMA*) SEASONALLY-FLOODED EURYHALINE SHALLOW-BOTTOM WETLAND. Santa Barbara Co., Goleta Valley, University of California Santa Barbara, Coal Oil Point Reserve, Devereux Slough.

* * * *

20.000 SYSTEM ESTUARINE
21.000 SUBSYSTEM INTERTIDAL
21.210 CLASS AQUATIC-BED

21.215 SUBCLASS FLOATING-VASCULAR

* * * *

20.000 SYSTEM ESTUARINE
21.000 SUBSYSTEM INTERTIDAL
21.240 CLASS EMERGENT WETLAND

21.241 SUBCLASS EMERGENT-PERSISTENT

Wetland Type No.: 21.241(12.5.821.6232)

ESTUARINE-INTERTIDAL EMERGENT-PERSISTENT (*SCIRPUS CALIFORNICUS*) IRREGULARLY-EXPOSED MIXOHALINE LOW-BRACKISH-MARSH WETLAND. Los Angeles Co., Malibu, Malibu Lagoon.

Wetland Type No.: 21.241(12.5.821/831.6231)

ESTUARINE-INTERTIDAL EMERGENT-PERSISTENT (*SCIRPUS AMERICANUS*) IRREGULARLY-EXPOSED MIXOHALINE LOW-BRACKISH FRINGE-MARSH WETLAND. San Luis Obispo Co., Morro Bay, Los Osos, Los Osos Creek. (Fig. 2, pg. 189).

Wetland Type No.: 21.241(12.5.821/831.6232,6233,6235)

ESTUARINE-INTERTIDAL EMERGENT-PERSISTENT (*SCIRPUS CALIFORNICUS*, *S. MARITIMUS*, *S. ROBUSTUS*) IRREGULARLY-EXPOSED MIXOHALINE LOW-BRACKISH FRINGE-MARSH WETLAND. San Luis Obispo Co., Morro Bay, Los Osos, Los Osos Creek.

Wetland Type No.: 21.241(13.5.331.5331)

ESTUARINE-INTERTIDAL EMERGENT-PERSISTENT (*SALICORNIA VIRGINICA*) REGULARLY-FLOODED MIXOSALINE ESTUARY-BANK WETLAND. San Luis Obispo Co., Morro Bay State Park, Morro Bay near Morro Creek; Los Angeles Co., Malibu State Beach, Malibu Lagoon.

Wetland Type No.: 21.241(13.5.811.6441)

ESTUARINE-INTERTIDAL EMERGENT-PERSISTENT (*SPARTINA FOLIOSA*) REGULARLY-FLOODED MIXOHALINE LOW-SALT-MARSH WETLAND. San Diego Co., Imperial Beach, Tijuana River Estuary, Tijuana River National Estuarine Research Reserve.

Wetland Type No.: 21.241(13.5.811.5331)

ESTUARINE EMERGENT-PERSISTENT (*SALICORNIA VIRGINICA*) REGULARLY-FLOODED MIXOHALINE LOW-SALT-MARSH WETLAND. San Diego Co., Imperial Beach, Tijuana Estuary, Tijuana River National Estuarine Research Reserve.

Wetland Type No.: 21.241(13.5.811.5331,5411)

ESTUARINE-INTERTIDAL EMERGENT-PERSISTENT (*SALICORNIA VIRGINICA*, *BATIS MARITIMA*) REGULARLY-FLOODED MIXOHALINE LOW-SALT-MARSH WETLAND. Ventura Co., Point Mugu Pacific Naval Air Station, Mugu Lagoon.

Wetland Type No.: 21.241(14.5.812.5331,5341)

ESTUARINE-INTERTIDAL EMERGENT-PERSISTENT (*SALICORNIA VIRGINICA*, *SUAEDA ESTEROA*) IRREGULARLY-FLOODED MIXOHALINE MIDDLE-SALT-MARSH WETLAND. Ventura Co., Point Mugu Pacific Naval Air Station, Mugu Lagoon.

Wetland Type No.: 21.241(14.5.812.5331,5451)

ESTUARINE-INTERTIDAL EMERGENT-PERSISTENT (*SALICORNIA VIRGINICA*, *LIMONIUM CALIFORNICUM*) IRREGULARLY-FLOODED MIXOHALINE MIDDLE-SALT-MARSH WETLAND. San Luis Obispo Co., Morro Bay, Morro Bay State Beach.

Wetland Type No.: 21.241(14.5.812.5332,5551)

ESTUARINE-INTERTIDAL EMERGENT-PERSISTENT (*SALICORNIA VIRGINICA*, *CORDYLANTHUS MARITIMUS*) IRREGULARLY-FLOODED MIXOHALINE MIDDLE-SALT-MARSH WETLAND. Santa Barbara Co., Carpinteria Valley, Carpinteria Salt Marsh Reserve. *Cordylanthus maritimus* ssp. *maritimus*, an endangered species, is a nonpersistent annual plant that seasonally can occur co-dominantly with *Salicornia virginica* and other middle and upper marsh species such as *Arthrocnemum subterminale*, *Atriplex watsonii*, and *Monanthochloe littoralis*.

Wetland Type No.: 21.241(15.5.331.5331,6232,6521)

ESTUARINE-INTERTIDAL EMERGENT-PERSISTENT (*PLUCHEA ODORATA*, *SCIRPUS CALIFORNICUS*, *TYPHA DOMINGENSIS*) SEASONALLY-EX-

POSED MIXOHALINE ESTUARY-BANK WETLAND. San Diego Co., Buena Vista Lagoon.

Wetland Type No.: 21.241(16.5.351.5441,6235)

ESTUARINE-INTERTIDAL EMERGENT-PERSISTENT (*FRANKENIA SALINA*, *SCIRPUS ROBUSTUS*) SEASONALLY-FLOODED MIXOHALINE ESTUARY-TERRACE WETLAND. Santa Barbara Co., Goleta Valley, University of California Santa Barbara, Coal Oil Point Reserve, Devereux Slough.

Wetland Type No.: 21.241(16.5.422.6234)

ESTUARINE-INTERTIDAL EMERGENT-PERSISTENT (*SCIRPUS PUNGENS*) SEASONALLY-FLOODED MIXOHALINE SHALLOW-BAR WETLAND. San Diego Co., Buena Vista Lagoon.

Wetland Type No.: 21.241(16.5.833.6232)

ESTUARINE-INTERTIDAL EMERGENT-PERSISTENT (*SCIRPUS CALIFORNICUS*) SEASONALLY-FLOODED MIXOHALINE HIGH-FRINGE-MARSH WETLAND. Ventura Co., San Buenaventura, Emma Wood State Beach, Ventura River Estuary.

* * * *

20.000 SYSTEM ESTUARINE

21.000 SUBSYSTEM INTERTIDAL

21.240 CLASS EMERGENT WETLAND

21.242 SUBCLASS NONPERSISTENT

Wetland Type No.: 21.242(14.7.520.5512)

ESTUARINE-INTERTIDAL EMERGENT-NONPERSISTENT (*LASTHENIA GLABRATA*) IRREGULARLY-FLOODED EURYHALINE DELTA WETLAND. Santa Barbara Co., Carpinteria Valley, Carpinteria Salt Marsh Reserve. Emergent-Nonpersistent Wetland dominated by *Lasthenia glabrata* ssp. *coulteri* also occurs with the perennial plants *Arthrocnemum subterminale*, *Salicornia virginica*, and *Monanthochloe littoralis*. Other "winter" annuals that occur with *Lasthenia* and also can be dominant include *Juncus bufonius*, *Hutchinsia procumbens*, *Parapholis incurva*, and *Spergularia marina*. The euryhaline type is bounded by lower-elevation hyperhaline salt flats downslope and other euryhaline wetlands upslope, dominated by the annual grass *Lolium multiflorum*.

Wetland Type No.: 21.242(15.5.420.5531,5541,5542)

ESTUARINE-INTERTIDAL EMERGENT-NONPERSISTENT (*SPERGULARIA*, *ATRIPLEX*, *CHENOPODIUM*) SEASONALLY-FLOODED MIXOHALINE SHALLOW-BAR WETLAND. Ventura Co., Ventura, Seaside Wilderness Park, Ventura River Estuary. When nonpersistent vegetation is lacking, this site belongs to Class Unconsolidated-Bottom. Depending on the status of estuary mouth opening or closure and the elevation of the bars and bed, the water regime can be Irregularly-Exposed, Regularly-Flooded, Irregularly-Flooded, or Seasonally-Flooded.

* * * *

20.000 SYSTEM ESTUARINE

21.000 SUBSYSTEM INTERTIDAL

21.250 CLASS SCRUB-SHRUB WETLAND

21.253 SUBCLASS BROADLEAVED-EVERGREEN

Wetland Type No.: 21.253(14.4.313.5632)

ESTUARINE-INTERTIDAL SCRUB-SHRUB BROADLEAVED-EVERGREEN (*SUAEDA CALIFORNICA*) IRREGULARLY-FLOODED EUHALINE ESTUARY-SHORE WETLAND. San Luis Obispo Co., Morro Bay, Morro Bay State Park. A narrow band of this succulent halophyte shrub occurs in scattered locations on the

margin of the estuary adjacent to unconsolidated shore wetland or emergent (salt marsh) wetland and upland habitats. *Suaeda californica* is an endangered species that currently is known only from Morro Bay.

Wetland Type No.: 21.253(14.5.313.5611,5624,5631,5633)

ESTUARINE-INTERTIDAL SCRUB-SHRUB BROADLEAVED-EVERGREEN (CARPOBROTUS, ISOCOMA, ATRIPLEX, SUAEDA) IRREGULARLY-FLOODED MIXOHALINE ESTUARY-SHORE WETLAND. San Diego Co., Camp Pendleton, Santa Margarita River Estuary. Dominants or characteristic species include *Carpobrotus edulis* (naturalized), *Isocoma menziesii*, *Atriplex lentiformis*, *Suaeda taxifolia*.

3. RIVERINE WETLANDS

Riverine environments within the study region include most of the California Chaparral Province, as designated by Bailey (1978) and illustrated by Cowardin et al. (1979). In this province, freshwater is limited and the climate is Mediterranean. The province covers approximately 400 miles of linear coastline and the adjacent study region includes many thousands of miles of riverine hydrogeomorphic units along hundreds of streams and rivers, some of which have been studied or visited during the course of this project (see Leidy et al. 1995).

The Riverine System is characterized by unidirectional flow from upstream to downstream within a channel. Cowardin et al. (1979) define the system as follows:

The Riverine System . . . includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and (2) habitats with water containing ocean-derived salts in excess of 0.5 ppt. A channel is "an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water" (Langbein and Iseri 1960, p. 5).

Cowardin et al. (1979) also have provided a description of the limits of this system, including two major features: (1) the system terminates downstream where the concentration of ocean-derived salts in the water exceeds 0.5 ppt during the period of annual low flow (=Estuarine), or where the channel enters a lake (=Lacustrine); and (2) the system terminates upstream where tributary streams originate, or where the channel leaves a lake. On the landward side of the channel, the Riverine System is bounded by upland, or by wetland dominated trees, shrubs, persistent emergents, emergent mosses, or lichens (=Palustrine).

30.000 SYSTEM RIVERINE

32.000 SUBSYSTEM UPPER-INTERMITTENT

32.120 CLASS UNCONSOLIDATED-BOTTOM

32.122 SUBCLASS SAND

Wetland Type No.: 32.122(23.1.463.1600)

RIVERINE UPPER-INTERMITTENT UNCONSOLIDATED-BOTTOM (SAND) SEMIPERMANENTLY-FLOODED VALLEY-RIVERBED WETLAND. San Diego Co., Upper San Luis Rey River Watershed, Matagual Creek, immediately upstream from State Route 79 bridge.

* * * * *

30.000 SYSTEM RIVERINE
32. SUBSYSTEM UPPER-INTERMITTENT
32.130 CLASS STREAMBED

32.131 SUBCLASS BEDROCK

Wetland Type No.: 32.131(28.1.211.1200)

RIVERINE UPPER-INTERMITTENT STREAMBED (BEDROCK) INTERMITTENTLY-FLOODED MONTANE-STREAM-CHANNEL WETLAND. Ventura Co., Dry Lakes Ridge, headwaters of the Ventura River.

* * * * *

30.000 SYSTEM RIVERINE
32.000 SUBSYSTEM UPPER-INTERMITTENT
32.130 CLASS STREAMBED

32.137 SUBCLASS VEGETATED

Wetland Type No.: 32.137(24.1.463.7000)

RIVERINE UPPER-INTERMITTENT STREAMBED-VEGETATED SEASONALLY-FLOODED VALLEY-RIVERBED WETLAND. San Diego Co., San Luis Rey River Watershed, above Lake Henshaw, Matagal Creek, upstream from State Route 79 bridge. Vegetation within river channel is dominated by native and exotic weedy annuals.

* * * * *

30.000 SYSTEM RIVERINE
33.000 SUBSYSTEM MID-INTERMITTENT
33.130 CLASS STREAMBED

33.133 SUBCLASS COBBLE-GRAVEL

Wetland Type No.: 33.133(24.1.452.1400)

RIVERINE MID-INTERMITTENT STREAMBED (COBBLE-GRAVEL) SEASONALLY-FLOODED TERRACE-STREAMBED WETLAND. San Luis Obispo Co., terrace of the Sierra Madre Mountain, Cottonwood Creek.

Wetland Type No.: 33.133 (28.1.541.1500)

RIVERINE MID-INTERMITTENT STREAMBED (COBBLE-GRAVEL) INTERMITTENTLY-FLOODED STREAM-WASH WETLAND. Los Angeles Co., Santa Clara River Watershed, Soledad Canyon, north of Santa Clarita.

* * * * *

30.000 SYSTEM RIVERINE
33.000 SUBSYSTEM MID-INTERMITTENT
33.130 CLASS STREAMBED

33.134 SUBCLASS SAND

Wetland Type No.: 33.134(28.1.543.1600)

RIVERINE MID-INTERMITTENT STREAMBED (SAND) INTERMITTENTLY-FLOODED ALLUVIAL-WASH WETLAND. Santa Barbara Co., Cuyuma River Watershed, Ballinger Canyon.

* * * * *

30.000 SYSTEM RIVERINE
33.000 SUBSYSTEM MID-INTERMITTENT
33.210 CLASS AQUATIC-BED

33.211 SUBCLASS ATTACHED-ALGAL

Wetland Type No.: 33.211(24.1.452.2200)

RIVERINE MID-INTERMITTENT AQUATIC-BED (ATTACHED-ALGAL)

SEASONALLY-FLOODED STREAMBED WETLAND. San Luis Obispo Co., terrace of the Sierra Madre Mountains, Cottonwood Creek.

* * * *

30.000 SYSTEM RIVERINE

34.000 SUBSYSTEM LOWER-INTERMITTENT

34.130 CLASS STREAMBED

34.133 SUBCLASS COBBLE-GRAVEL

Wetland Type No.: 34.133(27.1.452.1500)

RIVERINE LOWER-INTERMITTENT STREAMBED (COBBLE-GRAVEL) TEMPORARILY-FLOODED FOOTHILL-STREAMBED WETLAND. San Diego Co., San Clemente Canyon, south of State Route 52.

* * * *

30.000 SYSTEM RIVERINE

34.000 LOWER-INTERMITTENT

34.150 CLASS UNCONSOLIDATED-SHORE

34.151 SUBCLASS COBBLE-GRAVEL

Wetland Type No.: 34.151(27.1.322.1500)

RIVERINE LOWER-INTERMITTENT UNCONSOLIDATED-SHORE (COBBLE-GRAVEL) TEMPORARILY-FLOODED FOOTHILL-STREAM-SHORE WETLAND. San Diego Co., San Clemente Canyon, south of Route 52.

* * * *

30.000 SYSTEM RIVERINE

35.000 SUBSYSTEM UPPER-PERENNIAL

35.110 CLASS ROCK-BOTTOM

35.111 SUBCLASS BEDROCK

Wetland Type No.: 35.111(21.1.113.1200)

RIVERINE UPPER-PERENNIAL ROCK-BOTTOM (BEDROCK) PERMANENTLY-FLOODED MAIN-CHANNEL-POOL WETLAND. Santa Barbara Co., South Coast, foothills of the Santa Ynez Mountains, San Jose Creek. This pool supports the habitat function at low water for fish (trout) and amphibians (newt).

Wetland Type No.: 35.111(21.1.261.1200)

RIVERINE UPPER-PERENNIAL ROCK-BOTTOM (BED-ROCK) PERMANENTLY-FLOODED MONTANE-STREAM-FALL WETLAND. Santa Barbara Co., Santa Ynez Mountains, Nojoqui Falls County Park.

* * * *

30.000 SYSTEM RIVERINE

35.000 SUBSYSTEM UPPER-PERENNIAL

35.110 CLASS ROCK-BOTTOM

35.112 SUBCLASS BOULDER

Wetland Type No.: 35.112(21.1.113.1300)

RIVERINE UPPER-PERENNIAL ROCK-BOTTOM (BOULDER) PERMANENTLY-FLOODED MAIN-CHANNEL-POOL WETLAND. Santa Barbara Co., foothills of the San Rafael Mountains, Sedgwick Ranch, headwater of Figueroa Creek. The main-channel-pools form a series of step-pools.

Wetland Type No.: 35.112(21.1.114.1300)

RIVERINE UPPER-PERENNIAL ROCK-BOTTOM (BOULDER) PERMANENTLY-FLOODED SCOUR-POOL WETLAND. Ventura Co., Ventura River watershed, Matilija Creek, Wheeler Gorge.

Wetland Type No.: 35.112(21.1.121.1300)

RIVERINE UPPER-PERENNIAL ROCK-BOTTOM (BOULDER) PERMANENTLY-FLOODED-RIFFLE WETLAND. San Bernardino Co., San Bernardino Mountains, San Gorgonio Wilderness Area, Santa Ana River, South Fork.

Wetland Type No.: 35.112(21.1.211.1300)

RIVERINE UPPER-PERENNIAL ROCK-BOTTOM (BOULDER) PERMANENTLY-FLOODED MONTANE-STREAM-CHANNEL WETLAND. Santa Barbara County, Hollister Ranch, Santa Anita Canyon.

Wetland Type No.: 35.112(21.1.211.1500)

RIVERINE UPPER-PERENNIAL ROCK-BOTTOM (BOULDER) PERMANENTLY-FLOODED MONTANE-STREAM-CHANNEL WETLAND. San Bernardino Co., San Bernardino National Forest, San Gorgonio District, Vivian Creek. (Fig. 3, pg. 193).

* * * *

30.000 SYSTEM RIVERINE

35.000 SUBSYSTEM UPPER-PERENNIAL

35.210 CLASS AQUATIC-BED

35.211 SUBCLASS ATTACHED-ALGAL

Wetland Type No.: 35.211(21.1.261.2200)

RIVERINE UPPER-PERENNIAL AQUATIC-BED (ATTACHED-ALGAL) PERMANENTLY-FLOODED MONTANE-STREAM-FALL WETLAND. Santa Barbara Co., Santa Ynez Mountains, Nojoqui Falls County Park.

* * * *

30.000 SYSTEM RIVERINE

36.000 SUBSYSTEM MID-PERENNIAL

36.120 CLASS UNCONSOLIDATED-BOTTOM

36.121 SUBCLASS COBBLE-GRAVEL

Wetland Type No.: 36.121(21.1.124.1500)

RIVERINE MID-PERENNIAL UNCONSOLIDATED-BOTTOM (COBBLE-GRAVEL) PERMANENTLY-FLOODED RIVER-RUN WETLAND. San Diego Co., San Luis Rey River, downstream from Lake Henshaw.

Wetland Type No.: 36.121(21.1.124.1500)

RIVERINE MID-PERENNIAL UNCONSOLIDATED-BOTTOM (COBBLE-GRAVEL) PERMANENTLY-FLOODED RIVER-RUN WETLAND. Santa Barbara Co.; Los Padres National Forest, San Rafael Wilderness near Cliff Campground, Sisquoc River.

Wetland Type No.: 36.121(23.1.482.1500)

RIVERINE MID-PERENNIAL UNCONSOLIDATED-BOTTOM (COBBLE-GRAVEL) SEMIPERMANENTLY-FLOODED FOOTHILL-RIVER CHANNEL-BAR WETLAND. Santa Barbara Co., Los Padres National Forest, San Rafael Wilderness near Cliff Campground, Sisquoc River.

* * * *

30.000 SYSTEM RIVERINE

36.000 SUBSYSTEM MID-PERENNIAL

36.130 CLASS STREAMBED

36.137 SUBCLASS VEGETATED

Wetland Type No.: 36.137(21.1.214.6841)

RIVERINE MID-PERENNIAL STREAMBED-VEGETATED (*PASPALUM*)

***DISTICUM*) PERMANENTLY-FLOODED COASTAL-PLAIN STREAM-CHANNEL WETLAND.** Ventura Co., Ventura River Watershed, San Antonio Creek.

* * * *

30.000 SYSTEM RIVERINE
36.000 SUBSYSTEM MID-PERENNIAL
36.210 CLASS AQUATIC-BED
36.211 SUBCLASS ATTACHED-ALGAL

Wetland Type No.: 36.211(21.1.124.1500)
RIVERINE MID-PERENNIAL AQUATIC-BED ATTACHED-ALGAL PERMANENTLY-FLOODED MONTANE-STREAM WETLAND. Ventura Co., Piru Creek, 200 meters south of Agua Blanca and Piru Creek. Seasonally-flooded unconsolidated-shore habitat occurs adjacent to the permanently-flooded streambed.

* * * *

30.000 SYSTEM RIVERINE
37.000 SUBSYSTEM LOWER-PERENNIAL
37.110 CLASS ROCK-BOTTOM
37.112 SUBCLASS RUBBLE

Wetland Type No.: 37.112(21.1.455.1300)
RIVERINE LOWER-PERENNIAL ROCK-BOTTOM (RUBBLE) PERMANENTLY-FLOODED CANYON-STREAMBED WETLAND. Monterey Co., Santa Lucia Mountains, Los Padres National Forest, Mill Creek, canyon mouth at State Route 1. Transitional area to marine wetlands.

* * * *

30.000 SYSTEM RIVERINE
37.000 SUBSYSTEM LOWER PERENNIAL
37.120 CLASS UNCONSOLIDATED-BOTTOM
37.121 SUBCLASS COBBLE-GRAVEL

Wetland Type No.: 37.121(21.1.464.1400)
RIVERINE LOWER-PERENNIAL UNCONSOLIDATED-BOTTOM (COBBLE-GRAVEL) PERMANENTLY-FLOODED COASTAL-PLAIN RIVERBED WETLAND. Monterey Co., Andrew Molera State Park, Big Sur River, west of State Route 1.

Wetland Type No.: 37.121(24.1.474.1500)
RIVERINE LOWER-PERENNIAL UNCONSOLIDATED-BOTTOM (COBBLE-GRAVEL) SEASONALLY-FLOODED COASTAL-PLAIN STREAM-CHANNEL-BAR WETLAND. San Luis Obispo Co., Arroyo de la Cruz at State Route 1. The green alga *Enteromorpha* sp. characterizes the aquatic bed wetland in flooded portions of the channel.

* * * *

30.000 SYSTEM RIVERINE
37.000 SUBSYSTEM LOWER-PERENNIAL
37.120 CLASS UNCONSOLIDATED-BOTTOM
37.122 SUBCLASS SAND

Wetland Type No.: 37.122(24.1.464.1600)
RIVERINE LOWER-PERENNIAL UNCONSOLIDATED-BOTTOM (SAND) SEASONALLY-FLOODED COASTAL-PLAIN-RIVERBED WETLAND. Ventura Co., Santa Clara River, Southern Pacific Milling Site.

* * * *

30.000 SYSTEM RIVERINE
37.000 SUBSYSTEM LOWER-PERENNIAL
37.120 CLASS UNCONSOLIDATED-BOTTOM
37.123 SUBCLASS MUD

Wetland Type No.: 37.123(21.1.211.1700)

RIVERINE LOWER-PERENNIAL UNCONSOLIDATED-BOTTOM (MIXED FINES [MUD]) PERMANENTLY-FLOODED MONTANE-STREAM-CHANNEL WETLAND. Riverside Co., Santa Rosa Plateau. Characteristic species include *Marsilea vestita* and *Callitriche heterophylla*.

* * * *

30.000 SYSTEM RIVERINE
37.000 SUBSYSTEM LOWER-PERENNIAL
37.240 CLASS EMERGENT WETLAND
37.242 SUBCLASS EMERGENT-NONPERSISTENT

Wetland Type No.: 37.242(21.1.224.5572)

RIVERINE LOWER-PERENNIAL EMERGENT-NONPERSISTENT (*LUDWIGIA HEXAPETALA*) PERMANENTLY-FLOODED COASTAL-PLAIN RIVER-CHANNEL WETLAND. Ventura Co., San Buenaventura Main Street Bridge, Ventura River.

Wetland Type No.: 37.242(23.1.391.4323,6741,6926,6932)

RIVERINE LOWER-PERENNIAL EMERGENT-NONPERSISTENT (*MARSI-LEA VESTITA*, *PASPALUM DISTICHUM*, *JUNCUS XIPHIODES*, *ELEOCHARIS MACROSTACHYA*) SEMIPERMANENTLY-FLOODED STREAM-MARGIN WETLAND. Riverside Co., Santa Rosa Plateau.

Wetland Type No.: 37.242(24.1.474.5500,5521,5595,5766)

RIVERINE LOWER-PERENNIAL EMERGENT-NONPERSISTENT (MIXED-VASCULAR-PLANT) SEASONALLY-FLOODED COASTAL-PLAIN STREAM-CHANNEL-BAR WETLAND. San Luis Obispo Co., Morro Creek, at Morro Bay. Bar dominated by nonpersistent plants such as *Mimulus guttatus*, *Anthemis cotula*, and seedlings of *Salix lasiolepis*.

4. LACUSTRINE WETLANDS

What is most striking about the lacustrine system in central and southern California is its natural rarity. Only four natural lacustrine lakes are found in the study area, whereas a vast number of artificial lacustrine habitats (i.e., reservoirs) have been created throughout central and southern California. Each natural lake represents a unique combination of geomorphic position, flooding regime, and water chemistry, and supports a different complement of dominance types. We have identified two major types of lakes in this region—i.e., natural lakes and artificial reservoirs. These are distinguished further by their landform, topographic position, flooding regime, and water chemistry (see Fiedler et al. 1995).

The Lacustrine System (System No. 40.000) as delimited by Cowardin et al. (1979) includes two subsystems: (1) Subsystem Littoral (No. 41.000), considered here to be wetland habitats; and (2) Subsystem Limnetic (No. 42.000), considered to be deep-water habitats and not covered by this study. Cowardin et al. (1979, 11 P.) define this system as follows:

The Lacustrine System . . . includes wetlands and deepwater habitats with all of the following characteristics: (1) situated in a topographic depressions or a

dammed river channel; (2) lacking trees, shrubs, persistent emergents, emergent mosses, or lichens with greater than 30% areal coverage; and (3) total area exceeds 8 ha (20 acres). Similar wetland and deepwater habitats totaling less than 8 ha are also included in the Lacustrine System if an active wave formed or bedrock shoreline feature makes up all or part of the boundary, or if the water depth in the deepest part of the basin exceeds 2 m (6.6 feet) at low water. Lacustrine waters may be tidal or nontidal, but ocean-derived salinity is always less than 0.5 [ppt].

Cowardin et al. also have provided a description of the limits of the Lacustrine System, including: (1) landward boundaries at upland habitats or wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens; and, (2) the approximate contour of the "normal" spillway or pool elevation in dammed river channels, except where palustrine wetlands extend lakeward into the lacustrine environment. The littoral or wetland habitats of the Lacustrine System extend from the shoreward boundary of the system to a depth of 2 meters (6.6 feet) below low water or to the maximum extent of nonpersistent emergents, if these grow at depths greater than 2 meters.

40.000 SYSTEM LACUSTRINE

41.000 SUBSYSTEM LITTORAL

41.120 CLASS UNCONSOLIDATED BOTTOM

41.123 SUBCLASS MUD

Wetland Type No.: 41.123(28.1.441.1800)

LACUSTRINE-LITTORAL UNCONSOLIDATED-BOTTOM (MUD) INTERMITTENTLY-FLOODED MONTANE-LAKE-BED WETLAND. San Diego Co., Cuyamacha Mountains, Cuyamacha Lake.

Wetland Type No.: 41.123(28.3.442.1800)

LACUSTRINE-LITTORAL UNCONSOLIDATED-BOTTOM (MUD) INTERMITTENTLY-FLOODED ALKALI MONTANE-LAKE-BED WETLAND. San Bernardino Co., San Bernardino Mountains, Baldwin Lake.

* * * *

40.000 SYSTEM LACUSTRINE

41.000 SUBSYSTEM LITTORAL

41.120 CLASS UNCONSOLIDATED BOTTOM

41.125 SUBCLASS VEGETATED

Wetland Type No.: 41.125(28.3.442.1800,5541,5554,5559)

LACUSTRINE-LITTORAL UNCONSOLIDATED-BOTTOM-VEGETATED (MUD, *CHENOPODIUM*, *HELIOTROPIUM*, *SUAEDA*) INTERMITTENTLY-FLOODED ALKALI MONTANE-LAKE-BED WETLAND. San Bernardino Co., San Bernardino Mountains, Baldwin Lake (see Part II, Fig. 2a,b, pg. 143).

* * * *

40.000 SYSTEM LACUSTRINE

41.000 SUBSYSTEM LITTORAL

41.150 CLASS UNCONSOLIDATED SHORE

41.152 SUBCLASS SAND

Wetland Type No.: 41.152(28.3.332.1600)

LACUSTRINE-LITTORAL UNCONSOLIDATED-SHORE (SAND) INTERMITTENTLY-FLOODED ALKALI MONTANE-LAKE-SHORE WETLAND. San Bernardino Co., San Bernardino Mountains, Baldwin Lake.

* * * *

40.000 SYSTEM LACUSTRINE
41.000 SUBSYSTEM LITTORAL
41.150 CLASS UNCONSOLIDATED SHORE
41.153 SUBCLASS MUD (MIXED FINES)

Wetland Type No.: 41.153(28.1.331.1700)

LACUSTRINE-LITTORAL UNCONSOLIDATED-SHORE (MIXED-FINES) INTERMITTENTLY-FLOODED MONTANE-LAKE-SHORE WETLAND. San Diego Co., Cuyamaca Mountains, Lake Cuyamaca.

* * * *

40.000 SYSTEM LACUSTRINE
41.000 SUBSYSTEM LITTORAL
41.150 CLASS UNCONSOLIDATED SHORE
41.155 SUBCLASS VEGETATED

Wetland Type No.: 41.155(24.1.331.7000)

LACUSTRINE-LITTORAL UNCONSOLIDATED-SHORE VEGETATED (MIXED-VASCULAR-PLANTS) SEASONALLY-FLOODED MONTANE-LAKE-SHORE WETLAND. San Diego Co., Lake Henshaw.

Wetland Type No.: 41.155(24.1.334.1700,5544,5592,6923,6925)

LACUSTRINE-LITTORAL UNCONSOLIDATED-SHORE (MIXED-FINES, *CYPERUS*, *ELEOCHARIS*, *LIMOSELLA*, *RORRIPA*) SEASONALLY-FLOODED MONTANE-RESERVOIR-SHORE WETLAND. San Bernardino Co., San Bernardino Mountains, Big Bear Lake, Grout Bay (see next wetland below and Fig. 4, pg. 197).

Wetland Type No.: 41.155(24.1.334.1700,7000)

LACUSTRINE-LITTORAL UNCONSOLIDATED-SHORE (MIXED-FINES, MIXED-VASCULAR-PLANTS) SEASONALLY-FLOODED MONTANE-RESERVOIR-SHORE WETLAND. San Bernardino Co., San Bernardino Mountains, Big Bear Lake, Grout Bay (Fig. 4, pg. 197).

Wetland Type No.: 41.155 (28.1.334.7000)

LACUSTRINE-LITTORAL UNCONSOLIDATED-SHORE VEGETATED (MIXED-VASCULAR-PLANTS) INTERMITTANTLY-FLOODED MONTANE-LAKE-SHORE WETLAND. San Diego Co., Cuyamaca Mountains, Cuyamaca Lake.

* * * *

40.000 SYSTEM LACUSTRINE
41.000 SUBSYSTEM LITTORAL
41.210 CLASS AQUATIC BED
41.214 SUBCLASS ROOTED VASCULAR

Wetland Type No.: 41.214(23.1.446.6112)

LACUSTRINE-LITTORAL AQUATIC-BED ROOTED-VASCULAR (*ECHINODORUS BERTEROI*) SEMIPERMANENTLY-FLOODED CANYON-RESERVOIR-BOTTOM WETLAND. Ventura Co., Coyote Creek Watershed, Lake Castitas.

Wetland Type No.: 41.214(28.1.152.6152,6154,6161)

LACUSTRINE-LITTORAL AQUATIC-BED ROOTED-VASCULAR (*POTAMOGETON*, *RUPPIA*, *ZANNICHELLIA*) INTERMITTANTLY-FLOODED ALKALI MONTANE-LAKE WETLAND. San Bernardino Co., San Bernardino Mountains, Baldwin Lake.

* * * *

40.000 SYSTEM LACUSTRINE**41.000 SUBSYSTEM LITTORAL****41.240 CLASS EMERGENT WETLAND****41.242 SUBCLASS NONPERSISTENT**

Wetland Type No.: 41.242(21.1.154.5581)

LACUSTRINE-LITTORAL EMERGENT-NONPERSISTENT (*POLYGONUM EMERSUM* VAR. *EMERSUM*) PERMANENTLY-FLOODED MONTANE-RESERVOIR WETLAND. San Bernardino Co., San Bernardino Mountains, Big Bear Lake.

Wetland Type No.: 41.242(23.1.156.6112,6912)

LACUSTRINE-LITTORAL EMERGENT-NONPERSISTENT (*ECHINODORUS BERTEROI*) SEMIPERMANENTLY-FLOODED CANYON-RESERVOIR WETLAND. Ventura Co., Coyote Creek Watershed, Lake Casitas.

Wetland Type No.: 41.242(23.1.446.6112,6912)

LACUSTRINE-LITTORAL EMERGENT-NONPERSISTENT (*ECHINODORUS BERTEROI*) SEASONALLY-FLOODED CANYON-RESERVOIR-BED WETLAND. Ventura Co., Coyote Creek Watershed, Lake Casitas.

Wetland Type No.: 41.242(28.1.151.5582)

LACUSTRINE-LITTORAL EMERGENT-NONPERSISTENT (*POLYGONUM EMERSUM* VAR. *STIPULACEUM*) INTERMITTANTLY-FLOODED MONTANE-LAKE WETLAND. San Diego Co., Cuyamaca Mountains, Cuyamaca Lake.

5. PALUSTRINE WETLANDS

The study region covers approximately 640 km (400 mi) of coast, all or portions of nine California counties, and extends from approximately sea level to over 3000 m (9000 ft). Wetlands of the Palustrine System are bounded by upland or other habitats of the four additional systems of wetlands and deepwater habitats. In central and southern California, palustrine wetlands include habitats and/or biotic communities that have been called, for example, ponds, vernal pools and lakes, freshwater marshes or palustrine emergent wetlands, alkali flats, seeps and springs, dune swales, and riparian scrub, woodlands, and forests.

The Palustrine System (System No. 50.000) contains no subsystems as considered by Cowardin et al. (1979) because there is no overwhelming physical features of the environment (e.g., oceanic tides and salinity, shoreline waves, flowing water) that influence the formation of habitats and the structure of biotic communities. All elements of this system are wetlands. Cowardin et al. define the Palustrine System as follows:

The Palustrine System . . . includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppt [parts per thousand]. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 8 ha (20 acres); (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 2 m at low water; and (4) salinity due to ocean-derived salts less than 0.5 [ppt].

50.000 SYSTEM PALUSTRINE**50.120 CLASS UNCONSOLIDATED-BOTTOM****50.121 SUBCLASS COBBLE-GRAVEL**

Wetland Type No.: 50.121(21.1.824.1500)

PALUSTRINE UNCONSOLIDATED-BOTTOM (MIXED-COARSE) PERMANENTLY-FLOODED GLACIAL-POND WETLAND. San Bernardino Co., San Bernardino Mountains, San Gorgonio Wilderness Area, Dollar Lake.

* * * *

50.000 SYSTEM PALUSTRINE**50.120 CLASS UNCONSOLIDATED-BOTTOM****50.123 SUBCLASS MUD**

Wetland Type No.: 50.123(21.1.824.1700)

PALUSTRINE UNCONSOLIDATED-BOTTOM (MIXED-FINE TYPES) PERMANENTLY-FLOODED GLACIAL-POND WETLAND. San Bernardino Co., San Bernardino Mountains, San Gorgonio Wilderness Area, Dollar Lake.

Wetland Type No.: 50.123(24.1.823,825.1700,1800)

PALUSTRINE UNCONSOLIDATED-BOTTOM (MUD AND MIXED-FINES) SEASONALLY-FLOODED FAULT-SAG-POND AND VERNAL POND WETLANDS. Santa Barbara Co., Rancho Los Flores. Throughout the coastal mesas, foothills, plateaus, and valleys of the study region, small natural basins, which have a flooding duration that is generally longer than that of vernal pools but less than that of vernal lakes and marshes, form a group of vernal wetlands (i.e., vernal ponds) that have a distinctive combination of associated plant and animal species and that provide particular ecosystem functions. Ecosystem functions include breeding habitat for various amphibians including Western Toads and the endangered Spadefoot Toad and Tiger Salamander, and habitat for narrowly-restricted invertebrates such as Clam Shrimp.

Wetland Type No.: 50.123(24.1.825.1800)

PALUSTRINE UNCONSOLIDATED-BOTTOM (MUD) SEASONALLY-FLOODED VERNAL-POND WETLAND. Santa Barbara Co., foothill-valley of the San Rafael Mountains, Sedgwick Ranch. Persistent emergent vegetation dominated by *Eleocharis palustris* characterizes the margins of the pond and adjacent vernal marsh wetland. Nonpersistent emergent vegetation can colonize the outer margins or the center of the pond in drier years, forming a habitat with characteristics of vernal pools.

Wetland Type No.: 50.123(26.6.848.1700)

PALUSTRINE UNCONSOLIDATED-BOTTOM (MIXED-FINES) SEASONALLY-SATURATED EURYHALINE DIKED-ESTUARINE MARSH WETLAND. San Diego Co., San Eliho State Ecological Reserve.

* * * *

50.000 SYSTEM PALUSTRINE**50.150 CLASS UNCONSOLIDATED-SHORE****50.151 SUBCLASS COBBLE-GRAVEL**

Wetland Type No.: 50.151(24.1.824.1500)

PALUSTRINE UNCONSOLIDATED-SHORE (MIXED-COARSE) SEASONALLY-FLOODED GLACIAL-POND WETLAND. San Bernardino Co., San Bernardino Mountains, San Gorgonio Wilderness Area, Dollar Lake.

* * * *

50.000 SYSTEM PALUSTRINE**50.150 CLASS UNCONSOLIDATED-SHORE****50.153 SUBCLASS MUD**

Wetland Type No.: 50.153(24.1.824,1700,1800)

PALUSTRINE UNCONSOLIDATED-SHORE (MIXED-FINE TYPES) SEASONALLY-FLOODED GLACIAL-POND WETLAND. San Bernardino Co., San Bernardino Mountains, San Gorgonio Wilderness Area, Dollar Lake.

* * * *

50.000 SYSTEM PALUSTRINE**50.210 CLASS AQUATIC BED****50.212 SUBCLASS FLOATING-ALGAL**

Wetland Type No.: 50.212(21.1.141,2262)

PALUSTRINE AQUATIC-BED FLOATING-ALGAL (ENTEROMORPHA) PERMANENTLY-FLOODED DUNE-POND WETLAND. San Luis Obispo Co., Oso Flaco Lake. Dominant is the floating green alga *Enteromorpha* sp. Aquatic-Bed Rooted-Vascular species include *Potamogeton pectinatus*, *Ruppia cirrhosa*, and *Zannichellia palustris*.

Wetland Type No.: 50.212(21.1.147,2262)

PALUSTRINE AQUATIC-BED FLOATING-ALGA (ENTEROMORPHA) PERMANENTLY-FLOODED AGRICULTURAL-POND WETLAND. Santa Barbara Co., Vandenberg Air Force Base, MOD III Pond.

* * * *

50.000 SYSTEM PALUSTRINE**50.210 CLASS AQUATIC BED****50.214 SUBCLASS ROOTED-VASCULAR**

Wetland Type No.: 50.214(21.1.140,5100,6100)

PALUSTRINE AQUATIC-BED ROOTED-VASCULAR (MIXED MONOCOT AND DICOT TYPES) PERMANENTLY-FLOODED POND, "LAKE", AND RESERVOIR WETLANDS. San Luis Obispo Co., Oso Flaco Lake (dune pond); Pico Creek (canyon mouth pond). Santa Barbara Co.: Vandenberg Air Force Base (MOD III Pond); Hollister Ranch (agricultural ponds, impounded ponds). Ventura Co.: McGrath Lake (dune pond). Natural and artificial ponds often support dense growths of submerged, rooted aquatic vascular plants representing various genera and families of flower plants. Characteristic species include *Myriophyllum spicatum* spp. *exallescens*, *Najas marina*, *Potamogeton foliosus* spp. *foliosus*, *P. pectinatus*, *Ranunculus aquatilis*, *Ruppia cirrhosa*, *R. maritima*, and *Zannichellia palustris*. Associated species include attached algae such as *Chara* spp.; rooted aquatic plants such as *Egeria densa* and *Potamogeton crispus*; and floating plants such as *Azolla filiculoides*, *Hydrocotyle ranunculoides*, and *Lemna* spp. Ecosystem functions include food resources for many species of waterfowl, which disperse the characteristic plant species along the coast of California and elsewhere. The characteristic plant species are also an important component of the habitat for aquatic invertebrates and provide food, shelter, and shading for fish. These plants also contribute to water quality by absorbing pollutants and contribute to the reduction of water temperatures through shading.

Wetland Type No.: 50.214(21.1.726,5151,5161)

PALUSTRINE AQUATIC-BED ROOTED-VASCULAR (HIPURIS, RANUNCULUS) PERMANENTLY-FLOODED MONTANE-SPRING WETLAND. San Bernardino Co., San Bernardino Mountains, Baldwin Lake Watershed, Shay Meadow. Shay Meadow near Big Bear in the San Bernardino Mountains contains a unique montane valley spring. The perennial spring supports palustrine emergent and aquatic

bed wetlands and provides habitat for the endemic and endangered fish, the Shay Meadow Stickleback (*Gasterosteus aculeatus* subsp.). Land use practices in the area threaten the quality of habitat and the surrounding palustrine wetlands that are used for residential development, pasture, and corrals. Characteristic species include *Hippuris vulgaris*, *Ranunculus aquatilis*, and associated species include *Carex* sp., *Hordeum brachyantherum*, *Juncus balticus*, *Mimulus guttatus*, *Polygonum amphibium*, and *Scirpus acutus*. Aquatic bed species are various algae, *Chara* spp., and associated floating plants such as *Lemna* spp. An important ecosystem function of this wetland is that it serves as habitat for endangered species (e.g., Shay Meadows Stickleback). Other functions include as well as breeding habitat for western toads, food chain support, and hydrology (e.g., perennial fresh water source).

Wetland Type No.: 50.214(21.1.141.6152,6154,6161)

PALUSTRINE AQUATIC-BED ROOTED-VASCULAR (*POTAMOGETON*, *RUPPIA*, *ZANNICHELLIA*) PERMANENTLY-FLOODED DUNE-POND WETLAND. San Luis Obispo Co., Oso Flaco Lake. Dominants include *Potamogeton pectinatus*, *Ruppia cirrhosa*, and *Zannichellia palustris*. Aquatic-Bed Floating-Alga dominant is *Enteromorpha* sp.

Wetland Type No.: 50.214(21.1.147.5121,5142,6152,6161)

PALUSTRINE AQUATIC-BED ROOTED-VASCULAR (*CERATOPHYLLUM*, *MYRIOPHYLLUM*, *POTAMOGETON*, *ZANNICHELLIA*) PERMANENTLY-FLOODED AGRICULTURAL-POND WETLAND. Santa Barbara Co., Vandenberg Air Force Base, MOD III Pond.

* * * * *

50.000 SYSTEM PALUSTRINE

50.210 CLASS AQUATIC BED

50.215 SUBCLASS FLOATING-VASCULAR

Wetland Type No.: 50.215(21.1.130,140,850,4311,6140)

PALUSTRINE AQUATIC-BED FLOATING-VASCULAR (*AZOLLA*, *LEMNACEAE*) PERMANENTLY-FLOODED SPRING, POND, AND SWALE WETLAND. San Bernardino Co., San Bernardino National Forest (springs). Santa Barbara Co.: La Purissima Mission State Historic Park (historic Reservoirs); Vandenberg Air Force Base (ponds, dune swales); Hollister Ranch (agricultural ponds). Floating aquatic bed plants are common in many wetland habitats that are characterized by various water regimes. Duckweed (*Lemna*) and Duckweed Fern (*Azolla*) are the most common genera. Some habitats, especially those with nutrient enrichment, can support a cover of 100% floating species. Many species of floating vascular plants also occur in wetlands dominated by emergent vascular plants. Characteristic floating vascular species include *Azolla filiculoides*, *Lemna gibba*, *L. minuscula*, *L. minor*, *L. trisulca*, *L. valdiviana*, *Spirodella polyrrhiza*, *S. punctata*, *Wolffiella ligulata*, *W. columbiana*. Associated floating and emergent vascular plants include *Hydrocotyle ranunculoides* and *Rorripa nasturtium-aquaticum*. This wetland type functions in food chain support as food for water fowl and in maintaining water quality.

* * * * *

50.000 SYSTEM PALUSTRINE

50.240 CLASS EMERGENT WETLAND

50.241 SUBCLASS EMERGENT-PERSISTENT WETLAND

Wetland Type No.: 50.241(21-23.1.143.6251)

PALUSTRINE EMERGENT-PERSISTENT (*SCIRPUS ACUTUS*) PERMANENTLY- TO SEMIPERMANENTLY-FLOODED FAULT-SAG-POND WETLAND. Riverside Co., Temescal Wash.

Wetland Type No.: 50.241(21,23.1.214.6251,6721,6672)

PALUSTRINE EMERGENT-PERSISTENT (*SCIRPUS*, *SPARGANIUM*, *TYPHA*) PERMANENTLY- TO SEMIPERMANENTLY-FLOODED COASTAL-PLAIN STREAM-CHANNEL WETLAND. Santa Barbara Co., Vandenberg Air Force Base, San Antonio Creek. Dominant emergent species are *Scirpus acutus*, *Sparganium eurycarpum*, and *Typha domingensis*. The adjacent forested wetland is dominated by *Salix lasiolepis*.

Wetland Type No.: 50.241(21,25.2.563.4322,5325,6223,6255)

PALUSTRINE EMERGENT-PERSISTENT (*ATHYRIUM*, *STACHYS*, *CAREX*, *SCIRPUS*) PERMANENTLY-FLOODED TO PERMANENTLY-SATURATED ACIDIC CANYON-FLOODPLAIN WETLAND. San Luis Obispo Co., Nipomo Mesa Area, Black Lake Canyon. Dominants include *Athyrium filix-femina*, *Stachys chamissonis*, *Carex cusickii*, and *Scirpus microcarpus*.

Wetland Type No.: 50.241(21,25.2.563.6255,6733)

PALUSTRINE EMERGENT-PERSISTENT (*RORRIPA*, *SCIRPUS*, *TYPHA*) PERMANENTLY-FLOODED TO PERMANENTLY-SATURATED ACIDIC CANYON-FLOODPLAIN WETLAND. San Luis Obispo Co., Nipomo Mesa Area, Black Lake Canyon. The unusual, permanently wet, organic soils of the habitat support many rare and endangered species such as *Rorripa gambelii*, a broadleaved herbaceous species occurring among *S. microcarpus*, in addition to other species that reach their southern limits of distribution in the wetlands in Black Lake Canyon.

Wetland Type No.: 50.241(21,25.2.563.7000)

PALUSTRINE EMERGENT-PERSISTENT (MIXED VASCULAR) PERMANENTLY-FLOODED TO PERMANENTLY-SATURATED ACIDIC CANYON-FLOODPLAIN WETLAND. San Luis Obispo Co., Black Lake Canyon. Wetlands in unique canyon-bottoms in coastal central California are characterized by seasonally-flooded and permanently or semipermanently saturated hydrology. Various classes of palustrine wetlands occur in this HGM unit including a type of emergent wetland that supports many sensitive plant species. The wet, organic soils characterize a form of "bog-like" freshwater marsh where many northern plant species (e.g., *Carex cusickii*, *Calamagrostis nutkaensis*) reach their southern limits of distribution. Characteristic herbaceous species include *Arenaria paludicola*, *Athyrium filix-femina*, *Carex cusickii*, *Cladium californicum*, *Calamagrostis nutkaensis*, *Galium trifidum*, *Plantanthera leucostachys*, *Psoralea orbiculata*, *Rumex fenestratus*, *Rorripa gambelii*, *Scirpus microcarpus*, *S. americanus*, *Solidago confinis*, *Sparganium eurycarpum*, *Stachys chamissonis*, *Typha latifolia*, and *Urtica dioica*. Associated shrub species include *Baccharis douglasii*, *Lonicera involucrata*, and *Ribes divaricatum*. Associated trees include *Myrica californica* and *Salix lasiolepis*. Significant ecosystem functions include habitat for endangered species (i.e., *Arenaria paludicola*, *Rorripa gambelii*, and the Pacific Pond Turtle).

Wetland Type No.: 50.241(21.3.728.6252,6732)

PALUSTRINE PERSISTENT-EMERGENT (*SCIRPUS AMERICANUS*, *TYPHA DOMINGENSIS*) PERMANENTLY-FLOODED ALKALI VALLEY-SPRING WETLAND. San Luis Obispo Co., Cuyama Valley.

Wetland Type No.: 50.241(23.1.241.6251,6322)

PALUSTRINE EMERGENT-PERSISTENT (*SCIRPUS ACUTUS*, *JUNCUS OXYMERIS*) SEMIPERMANENTLY-FLOODED MONTANE-DRAINAGE-CHANNEL WETLAND. San Diego Co., Rancho Cuyamacha State Park, vicinity of Cuyamacha Lake.

Wetland Type No.: 50.241(23.1.849.6253,6732)

PALUSTRINE EMERGENT-PERSISTENT (*SCIRPUS CALIFORNICUS*, *TYPHA DOMINGENSIS*) SEMIPERMANENTLY-FLOODED LAGOON-SHORE WETLAND. San Diego Co., Oceanside, Buena Vista Lagoon.

Wetland Type No.: 50.241(24.1.374.6255)

PALUSTRINE EMERGENT-PERSISTENT (*SCIRPUS MICROCARPUS*) SEASONALLY-FLOODED COASTAL-PLAIN STREAM-BANK WETLAND. San Luis Obispo Co., Morro Bay, Morro Creek.

Wetland Type No.: 50.241(24.1.145.6242)

PALUSTRINE EMERGENT-PERSISTENT (*ELEOCHARIS MACROSTACHYA*) SEASONALLY-FLOODED VERNAL-POND WETLAND. Santa Barbara Co., foothill-valley of the San Rafael Mountains, Sedgwick Ranch. Persistent emergent vegetation dominated by *Eleocharis palustris* characterizes the margins of the pond and adjacent vernal marsh wetland. Nonpersistent emergent vegetation can colonize the outer margins or the center of the pond in drier years, forming a habitat with characteristics of vernal pools.

Wetland Type No.: 50.241(24.1.811.1100)

PALUSTRINE PERSISTENT-EMERGENT SEASONALLY-FLOODED VERNAL-POOL WETLAND. Santa Barbara Co., Goleta, Ellwood Mesa. Depending on the time of year, flooding state of the water regime, and dominant type of substrate or organisms, such vernal pools may be classified as several wetland types, including unconsolidated-bottom, aquatic bed, emergent-persistent, and emergent-nonpersistent wetlands.

Wetland Type No.: 50.241(24.1.811.5224,6241,6242)

PALUSTRINE PERSISTENT-EMERGENT (*ERYNGIUM VASEYI*, *ELEOCHARIS* SPP.) SEASONALLY-FLOODED COASTAL-MESA VERNAL-POOL WETLAND. Santa Barbara Co., Goleta, Ellwood Mesa. Although many vernal pools support nonpersistent emergent vegetation, those of the Santa Barbara area are generally characterized by persistent vegetation that is dominated by *Eryngium vaseyi*, *Eleocharis acicularis*, and *Eleocharis macrostachya*. Numerous species characteristic of nonpersistent vegetation also occur in these pools, including the annual plants *Callitriche marginata*, *Crassula aquatica*, *Elatine brachysperma*, and *Psilocarphus brevissimus*.

Wetland Type No.: 50.241(24.1.816.7000)

PALUSTRINE EMERGENT-PERSISTENT (MIXED VASCULAR) PLATEAU-VERNAL-POOL WETLAND. Riverside Co., Santa Rosa Plateau. Dominant species include *Deschampsia danthonioides*, *Blennosperma nanum*, *Alopecurus saccatus*, *Psilocarphus brevissimus*, *Plantago elongata*, *Callitriche marginata*, *Veronica peregrina*, *Lasthenia californica*, *Lilaea scilloides*, *Plagiobothrys undulatus*, *Eryngium aristulatum*, *Elatine brachysperma*, *Crassula aquatica*, *Eleocharis acicularis*.

Wetland Type No.: 50.241(24.1.826.6242,6612)

PALUSTRINE EMERGENT-PERSISTENT (*ELEOCHARIS MACROSTACHYA*, *PASPALUM DISTICHUM*) SEASONALLY-FLOODED VERNAL-LAKE WETLAND. Riverside Co., Santa Rosa Plateau, Mesa de Colorado. Vernal wetlands of the Plateau vary in size and function from vernal pools to vernal lakes and from vernal marshes to tenajas. The extensive variation and gradation among types contribute to the species richness of the plateau. Dominance types can vary depending upon the time of year, and the depth and duration of flooding. Margins of vernal lakes and pools may be dominated by *Blennosperma nanum*, whereas *Lilaea scilloides* may dominate bottoms of depressions that flood longer. As sites desiccate, dominance types also may change, whereby species characteristic of flooded conditions are replaced by species that colonize exposed soils.

Wetland Type No.: 50.241(24.1.826.5566,6111,6240)

PALUSTRINE EMERGENT-PERSISTENT (*AMMANNIA*, *ALISMA*, *ELEOCHARIS*) SEASONALLY-FLOODED VERNAL-LAKE WETLAND. Santa Barbara Co., Laguna Blanca (now seriously degraded) and historically the "lagunitas" in the Carpinteria Valley; Ventura Co., Mirror Lake in the Ojai Valley; Orange Co.,

Upper Laguna Lake in Laguna Canyon. Characteristic species include *Alisma plantago-aquatica*, *Ammannia coccinea*, *Bergia texana*, *Crassula aquatica*, *Cyperus aristatus*, *Eleocharis acicularis*, *E. macrostachya*, *Hydrocotyle ranunculoides*, *Limosella acaulis*, *Lindernia dubia* var. *anagallidea*, *Marsillea vestita*, *Pilularia americana*, *Sagittaria sanfordii*, and *Xanthium strumarium*.

Wetland Type No.: 50.241(24.1.831.5261,6210,6320,6594)

PALUSTRINE EMERGENT-PERSISTENT (*SOLIDAGO*, *CAREX*, *JUNCUS*, *MUHLENBERGIA*) SEASONALLY-FLOODED MONTANE-VERNAL-MEADOW WETLAND. San Diego Co., Cleveland National Forest, Laguna Mountains, Laguna Fire Station. These montane meadows are rich in plant species and are dominated or characterized by *Solidago californica*, *Carex* spp., *Juncus balticus*, *J. tenuis*, and *Muhlenbergia rigens*. Other characteristic genera include *Artemisia*, *Aster*, *Gnaphalium*, *Mimulus*, and *Sidalcea*.

Wetland Type No.: 50.241(24.1.851.6317)

PALUSTRINE PERSISTENT-EMERGENT (*JUNCUS MEXICANUS*) SEASONALLY-FLOODED MONTANE-DRAINAGE-SWALE WETLAND. San Diego Co., Cleveland National Forest, Laguna Mountains, Meadows Information Station.

Wetland Type No.: 50.241(24.1.851.6325)

PALUSTRINE EMERGENT-PERSISTENT (*JUNCUS RUGULOSUS*) SEASONALLY-FLOODED MONTANE-DRAINAGE-SWALE WETLAND. Riverside Co., Santa Ana Mountains, DeLuz Creek Watershed, DeLuz Rd. and Via Vaquera. This wetland can also be classified as a form of vernal-marsh that is characterized by other monocot hydrophytes such as *Eleocharis macrostachya*, *Juncus mexicanus*, and *Leymus triticoides*.

Wetland Type No.: 50.241(24,25.1.832.7000)

PALUSTRINE EMERGENT-PERSISTENT (MIXED VASCULAR) SEASONALLY-FLOODED AND PERMANENTLY SATURATED MONTANE-PERENNIAL-MEADOW WETLAND. San Bernardino Co., San Bernardino Mountains, San Geronio Wilderness Area, South Fork of the Santa Ana River. Permanently saturated meadows along the South Fork have perhaps the richest flora of the study region. This wetland type occurs in a *Abies concolor* (White Fir) and *Pinus jeffreyi* (Jeffrey Pine) forest setting. Plant genera represented include, for example, grasses (*Elymus*, *Poa*, *Glyceria*), rushes (*Juncus*, *Luzula*), sedges (*Carex*, *Eleocharis*), and many forbs (*Angelica*, *Aster*, *Berula*, *Dephningium*, *Barbarea*, *Dodecatheon*, *Heracleum*, *Geranium*, *Helonium*, *Hypericum*, *Epilobium*, *Gayophytum*, *Gentiana*, *Lilium*, *Lupinus*, *Lotus*, *Senecio*, *Stachys*, *Veratrum*, *Smilacina*, *Sidalcea*, *Solidago*, and others).

Wetland Type No.: 50.241(24,26.1.831.7000)

PALUSTRINE EMERGENT-PERSISTENT (MIXED VASCULAR) SEASONALLY-FLOODED MONTANE-VERNAL-MEADOW WETLAND. San Bernardino Co., San Bernardino Mountains, San Bernardino National Forest, meadow at Champion Lodgepole Pine. "Dry" (seasonally saturated) meadows occur in the San Bernardino Mountains in openings in forests dominated by *Abies concolor*, *Pinus contorta*, and *Pinus jeffreyi*. They are characterized by mineral rather than organic soils and are rich in plant species, although generally dominated by sedges, rushes, and grasses. Meadows in this mountain range vary considerably depending upon the depth and duration of flooding and whether they remain saturated during the dry summers or dessicate. Characteristic species include *Achillea millifolium*, *Agrostis* sp., *Aquilegia frondosa*, *Carex praegracilis*, *Carex* spp., *Castilleja* spp., *Danthonia californica* var. *americana*, *Elymus glaucus*, *Glyceria* sp., *Juncus balticus*, *Juncus* sp., *Potentilla glandulosa*, *Pteridium aquilinum*, *Smilacina racemosa*.

Wetland Type No.: 50.241(24,26.1.854,6324)

PALUSTRINE EMERGENT-PERSISTENT (*JUNCUS PHAEOCEPHALUS*)

SEASONALLY-FLOODED VERNAL-DRAINAGE-SWALE WETLAND. San Luis Obispo Co., Piedras Blancas and San Simeon State Beach.

Wetland Type No.: 50.241(24,28,3,152,6251)

PALUSTRINE EMERGENT-PERSISTENT (*SCIRPUS ACUTUS*) SEASONALLY TO INTERMITTANTLY-FLOODED MONTANE-ALKALI-LAKE WETLAND. San Bernardino Co., Baldwin Lake. Baldwin Lake in the San Bernardino National Forest is a naturally, seasonally-flooded, alkali lake that occurs on the eastern-most edge of the coastward draining watersheds of the San Bernardino Mountains. It is situated, however, in a basin without external drainage. Although it does not flood every year, the lake shore and bed supports palustrine persistent-emergent vegetation of several dominance types in addition to lacustrine wetlands such those that develop along wave-formed shorelines.

Wetland Type No.: 50.241(26,1,712,714,5453)

PALUSTRINE PERSISTENT-EMERGENT (*NICOTIANA QUADRIVALIS*) SEASONALLY-SATURATED SLOPE AND STREAM-BANK-SEEP WETLAND. San Luis Obispo Co., Cuyama Valley, Cottonwood Creek. This unique wetland occurs in a grassland setting as a seep mud-flow disturbance site, which is dominated by a dense stand of the native annual *Nicotiana quadrivalis* (Indian Tall Tobacco). *Heliotropium curassavicum* is an associated species.

Wetland Type No.: 50.241(26,1,716,6242,6325)

PALUSTRINE PERSISTENT-EMERGENT (*ELOECHARIS MACROSTACHYA*, *JUNCUS RUGULOSUS*) SEASONALLY-SATURATED PLATEAU-SEEP WETLAND. Riverside Co., Santa Rosa Plateau, Slaughterhouse Canyon area, Clinton-Keith Road. Characteristic species include *Sidalcea* sp., *Lythrum* sp., *Juncus bufonius*, *Astragalus* sp., *Cerastium* sp., *Erodium* sp., and *Bromus hordeaceus*.

Wetland Type No.: 50.241(26,1,851,6222,6242,6325,6594)

PALUSTRINE EMERGENT-PERSISTENT (*CAREX PRAEGRACILIS*, *ELOECHARIS MACROSTACHYA*, *JUNCUS RUGULOSUS*, *MUHLENBERGIA RIGENS*) SEASONALLY-FLOODED MONTANE-DRAINAGE-SWALE WETLAND. Riverside Co., Santa Rosa Plateau, Slaughterhouse Canyon Area, Clinton-Keith Rd.

Wetland Type No.: 50.241(26,1,853,6311,6317)

PALUSTRINE EMERGENT-PERSISTENT (*JUNCUS ACUTUS*, *JUNCUS MEXICANUS*) SEASONALLY-SATURATED BEACH-SWALE WETLAND. San Diego Co., Encinitas, South Carlsbad State Beach, Batiquitos Lagoon.

Wetland Type No.: 50.241(26,3,398,5252,5256,6481,6652)

PALUSTRINE EMERGENT-PERSISTENT (*ARTEMISIA*, *GUTIERREZIA*, *DISTICHLIS*, *POA*) SEASONALLY-SATURATED ALKALI SPRING-MARGIN WETLAND. San Bernardino Co., San Bernardino Mountains, Baldwin Lake Ecological Reserve. The mixed-vascular dominance types and endemic flora contribute to the species richness. Dominant or characteristic species can include *Artemisia ludoviciana*, *Gutierrezia sarothrae*, *Distichlis spicata*, and *Poa secunda*. Endemic and rare or endangered species include *Castilleja cinerea*, *Ivesia argyrocoma*, *Sidalcea pedata*, and *Thelypodium stenopetalum*.

Wetland Type No.: 50.241(26,3,831,5252,5265,6481,6652)

PALUSTRINE EMERGENT-PERSISTENT (*ARTEMISIA*, *GUTIERREZIA*, *DISTICHLIS*, *POA*) SEASONALLY-SATURATED ALKALI MONTANE-MEADOW WETLAND. San Bernardino Co., San Bernardino Mountains, Big Bear Lake, Eagle Point. Although the habitat is different than the spring-margin alkali type, this alkali meadow supports the same type of wetland dominants and the endemic, endangered flora restricted to the old deltaic sediments, which were deposited in Pleistocene lakes that once characterized the region.

Wetland Type No.: 50.241 (26.3.398.5291, 6481, 6582)

PALUSTRINE EMERGENT-PERSISTENT (*FRANKENIA*, *DISTICHLIS*, *LEYMUS*) SEASONALLY-SATURATED ALKALI SPRING-MARGIN WETLAND. San Luis Obispo Co., Cuyama Valley.

Wetland Type No.: 50.241(26.6.551.5272,5291,5552,6481)

PALUSTRINE EMERGENT-PERSISTENT (*SALICORNIA*, *FRANKENIA*, *ATRIPLEX*, *DISTICHLIS*) SEASONALLY-SATURATED EURYHALINE STREAM-FLOODPLAIN WETLAND. San Diego Co., San Elijo State Ecological Preserve.

Wetland Type No.: 50.241(26.6.848.5272.5291)

PALUSTRINE EMERGENT-PERSISTENT (*SALICORNIA VIRGINICA*, *FRANKENIA SALINA*) SEASONALLY-SATURATED EURYHALINE DIKED-ESTUARINE-MARSH WETLAND. San Diego Co., San Elijo State Ecological Preserve.

Wetland Type No.: 50.241(26.6.849.5259.6256.6311.6481)

PALUSTRINE EMERGENT-PERSISTENT (*JAUMEA CARNOSA*, *SCIRPUS PUNGENS*, *JUNCUS ACUTUS*, *DISTICHLIS SPICATA*) SEASONALLY-SATURATED EURYHALINE LAGOON-SHORE-MARSH WETLAND. San Diego Co., Oceanside, Buena Vista Lagoon.

Wetland Type No.: 50.241(27.1.833.7000)

PALUSTRINE EMERGENT-PERSISTENT (MIXED VASCULAR) TEMPORARILY-FLOODED BEACH-SWALE WETLAND. San Diego Co., Encinitas, South Carlsbad State Beach, Batiquitos Lagoon in barrow pit. Dominant species include *Xanthium strumarium*, *Cyperus eragrostis*, *Paspalum dilatatum*, *Conyza canadensis*, *Lythrum hyssopifolia*, *Chenopodium ambrosioides*, *Gnaphalium luteo-album*.

Wetland Type No.: 50.241(28.1.551.6222,6317,6582)

PALUSTRINE EMERGENT-PERSISTENT (*CAREX PRAEGRACILIS*, *JUNCUS MEXICANUS*, *LEYMUS TRITICOIDES*) INTERMITTANTLY-FLOODED STREAM-FLOODPLAIN WETLAND. Riverside Co., Santa Rosa Plateau.

* * * *

50.000 SYSTEM PALUSTRINE

50.240 CLASS EMERGENT WETLAND

50.242 SUBCLASS EMERGENT-NONPERSISTENT WETLAND

Wetland Type No.: 50.242(24.1.112.1500,5595)

PALUSTRINE EMERGENT-NONPERSISTENT (MIXED-COARSE AND *MIMULUS GUTTATUS*) SEASONALLY-FLOODED TENAJA WETLAND. Riverside Co., Ranta Rosa Plateau, Volcano Rd. at Rancho California Rd.

Wetland Type No.: 50.242(24.1.812.1500,1600,5547)

PALUSTRINE EMERGENT-NONPERSISTENT (*DOWNINGIA CUSPIDATA*, MIXED-COARSE, SAND TYPES) SEASONALLY-FLOODED MESA-VERNAL-POOL WETLAND. San Diego Co., Kearny Mesa, Miramar Mounds National Natural Monument.

Wetland Type No.: 50.242(24.1.812.5547)

PALUSTRINE EMERGENT-NONPERSISTENT (*DOWNINGIA CUSPIDATA*) SEASONALLY-FLOODED MESA-VERNAL-POOL WETLAND. San Diego Co., Kearny Mesa, Miramar Mounds National Natural Monument.

Wetland Type Nos.: 50.242(24.1.812.5532)

PALUSTRINE EMERGENT-NONPERSISTENT (*LASTHENIA CALIFORNICA*) SEASONALLY-FLOODED MESA-VERNAL-POOL WETLAND. San Diego Co., Otay Mesa, Upper O'Neil Canyon. This driest phase of the Otay vernal

pools is characterized by upland and wetland annual species and is dominated by *Lasthenia californica*.

Wetland Type No.: 50.242(24.1.812.5532)

PALUSTRINE EMERGENT-NONPERSISTENT (*LASTHENIA CALIFORNICA*) SEASONALLY-FLOODED MESA-VERNAL-POOL WETLAND. San Diego Co., Otay Mesa, Upper O'Neil Canyon.

Wetland Type No.: 50.242(24.1.826.7000)

PALUSTRINE EMERGENT-NONPERSISTENT (MIXED VASCULAR) SEASONALLY-FLOODED VERNAL-LAKE WETLAND. Riverside Co., Santa Rosa Plateau.

Wetland Type No.: 50.242(24.26.6.511,524,7000)

PALUSTRINE EMERGENT-NONPERSISTENT (MIXED VASCULAR) SEASONALLY-FLOODED OR SATURATED EURYHALINE VERNAL-FLAT OR PLAIN WETLAND. Santa Barbara Co., Santa Barbara Municipal Airport at Goleta Slough; Ventura Co., Pt. Mugu Pacific Missile Testing Center at Mugu Lagoon; San Diego Co., San Dieguito Lagoon. Coastal streams that flow into saline or hypersaline estuarine environments generally produce deltas that are characterized by seasonally-saturated nontidal palustrine wetlands as well as irregularly-flooded intertidal estuarine wetlands. The palustrine wetlands are generally seriously degraded by urbanization and often are separated from the deltaic continuum by berms, ditches, roads, runways, and other artificial structures. The palustrine habitats dominated by annual plants are classified as Palustrine Nonpersistent Emergent Wetlands, whereas those dominated by perennials or shrubs are classified as Palustrine Persistent Emergent or Scrub-Shrub Wetlands. Characteristic species include *Atriplex argentea* var. *mohavensis*, *A. triangularis*, *Hordeum depressum*, *Hutchinsia procumbens*, *Juncus bufonius*, *Lasthenia glabrata* ssp. *coulteri*, *Salicornia europaea*, *Spergularia marina*, and *Suaeda calceoliformis*.

Wetland Type No.: 50.242(24.26.1.522,7000)

PALUSTRINE EMERGENT-NONPERSISTENT (MIXED VASCULAR) SEASONALLY-FLOODED MONTANE-VERNAL-PLAIN WETLAND. Ventura Co., Upper Ojai Valley; Riverside Co., Murrietta Valley. These unique vernal plains have been heavily impacted by agriculture and grazing, and today support mostly naturalized (and native) weedy species. These include *Anthemis cotula*, *Juncus bufonius*, *Lythrum hyssopifolia*, *Lolium multiflorum*, *Polypogon monspeliensis*.

Wetland Type No.: 50.242(24.26.1.854.6821)

PALUSTRINE EMERGENT-NONPERSISTENT (*LOLIUM MULTIFLORUM*) SEASONALLY-SATURATED VERNAL-DRAINAGE-SWALE WETLAND. Santa Barbara Co., Dos Pueblos Rancho. Coastal drainage swales of the region generally occur in grassland settings and serve as rangeland for cattle. The dominant annual grass in this wetland swale is *Lolium multiflorum*.

Wetland Type No.: 50.242(26.3.523.5532)

PALUSTRINE EMERGENT-NONPERSISTENT (*LASTHENIA CALIFORNICA*) SEASONALLY-FLOODED ALKALI VERNAL-PLAIN WETLAND. Riverside Co., Old Salt Creek Drainage west of Hemet, Florida Ave. and Warren Rd. Small basins forming vernal pools with different dominance types occur throughout the plain. The disked, desiccated plain is dominated by *Lasthenia californica*, but may appear with different dominant plant species depending on the time of year, amount of rainfall in a particular year, proximity to local vernal pool areas, and degree of disturbance (Fig. 5, pg. 197).

Wetland Type No.: 50.242(26.6.848.5558)

PALUSTRINE EMERGENT-NONPERSISTENT (*SALICORNIA EUROPEA*) SEASONALLY-SATURATED EURYHALINE DIKED-ESTUARINE-MARSH WETLAND. San Diego Co., San Elijo State Ecological Reserve.

Wetland Type No.: 50.242(28.3.333.5533)

PALUSTRINE EMERGENT-NONPERSISTENT (*LASTHENIA GLABRATA*) INTERMITTENTLY-FLOODED ALKALI PLAYA-LAKE-SHORE WETLAND. Riverside Co., San Jacinto Valley, San Jacinto Wildlife Area, vicinity of Mystic Lake. Fragmentation of wetlands of the region has converted some lacustrine wetlands into palustrine types.

* * * *

50.000 SYSTEM PALUSTRINE

50.250 CLASS SCRUB-SHRUB WETLAND

50.251 SUBCLASS BROADLEAVED-DECIDUOUS

Wetland Type No.: 50.251(23.1.155.5765,5766)

PALUSTRINE SCRUB-SHRUB BROADLEAVED-DECIDUOUS (*SALIX LAEVIGATA*, *SALIX LASIOLEPIS*) SEMIPERMANENTLY-FLOODED RIVER-VALLEY-RESERVOIR WETLAND. San Luis Obispo Co., Twitchell Reservoir on the Cuyama River at Alamo Creek. The willow scrub formed on alluvial deposits in the reservoir during low-water conditions.

Wetland Type No.: 50.251(24.1.482.5769)

PALUSTRINE SCRUB-SHRUB BROADLEAVED-DECIDUOUS (*SALIX SCOULERIANA*) SEASONALLY-FLOODED FOOTHILL-RIVER CHANNEL-BAR WETLAND. Monterey Co., Pfeiffer Big Sur State Park, Big Sur River. Scrub-shrub wetland dominated by *Salix scouleriana* occurs on a channel-bar adjacent to riverine unconsolidated-bottom wetland.

Wetland Type No.: 50.251(24.25.1.716,726,824,5768)

PALUSTRINE SCRUB-SHRUB BROADLEAVED-DECIDUOUS (*SALIX LUTEA*) SEASONALLY-FLOODED AND PERMANENTLY-SATURATED MONTANE-SPRING, SEEP AND GLACIAL POND WETLANDS. San Bernardino Co., San Geronio Wilderness Area, Dollar Lake. Scattered patches of willow-dominated scrub-shrub wetland occur at many wetland habitats in the Transverse Ranges. *Salix lutea* is common at high elevations in the study region.

Wetland Type No.: 50.251(24.25.1.375,716,726,5791)

PALUSTRINE SCRUB-SHRUB BROADLEAVED-DECIDUOUS (*VITIS GIRDIANA*) PERMANENTLY AND SEASONALLY-SATURATED CANYON-STREAM-BANK, MONTANE-SEEP AND MONTANE-SPRING WETLANDS. San Bernardino Co., San Bernardino Mountains, City Canyon, along Rt. 330. Scattered dense tangles of this native grape dominate seeps and springs along rocky banks at ledges of montane canyons, such as along Rt. 330.

Wetland Type No.: 50.251(25.1.375,715,5756)

PALUSTRINE SCRUB-SHRUB BROADLEAVED-DECIDUOUS (*RUBUS PARVIFLORUS*) PERMANENTLY-SATURATED RIVER-BANK-SEEP WETLAND. Monterey Co., Banks of the Big Sur River, Pfeiffer Big Sur State Park, Santa Lucia Mountains. In the central coastal portion of California, e.g., in the Santa Lucia Mountains, perennial seeps and springs generally support a rich association of hydrophytic shrubs and herbaceous plants. When shrubs dominate these conditions, *Rubus parviflorus* is frequently the shrub that characterizes the vegetation of this hydrogeomorphic unit.

Wetland Type No.: 50.251(26.1.851.5752)

PALUSTRINE SCRUB-SHRUB BROADLEAVED-DECIDUOUS (*ROSA CALIFORNICA*) SEASONALLY-SATURATED MONTANE-DRAINAGE-SWALE WETLAND. San Diego Co., Laguna Mountains, Cleveland National Forest, Meadows Information Station. This wetland occurs on the edges of swales characterized by palustrine emergent wetland and dominated by rushes such as *Juncus mexicanus*.

* * * *

50.000 SYSTEM PALUSTRINE**50.250 CLASS SCRUB-SHRUB WETLAND****50.253 SUBCLASS BROADLEAVED-EVERGREEN**

Wetland Type No.: 50.253 (24.1.453.5623)

PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*BACCHARIS SALICIFOLIA*) SEASONALLY-FLOODED VALLEY-STREAMBED WETLAND. San Diego Co., Cottonwood Creek, Rt. S-1 northwest of Lake Morena.

Wetland Type No.: 50.253(24.1.453.5781)

PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*TAMARIX RAMOSISSIMA*) SEASONALLY-FLOODED VALLEY-STREAMBED WETLAND. San Diego Co., Cottonwood Creek, Rt. S-1 northwest of Lake Morena. This wetland is dominated by the invasive-exotic shrub *Tamarix ramosissima*.

Wetland Type No.: 50.253(26.3.398.5643)

PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*SUAEDA MOQUINII*) SEASONALLY-SATURATED ALKALI SPRING-MARGIN WETLAND. San Luis Obispo Co., Cuyama River Valley, Highway 166, east of Highway 33.

Wetland Type No.: 50.253(26,29.1.853.5622)

PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*BACCHARIS PILULARIS*) SEASONALLY-SATURATED OR PHREATOPHYTIC DUNE-SWALE WETLAND. Santa Barbara Co. San Antonio Terrace, Vandenberg Air Force Base. Dune swale wetlands in coastal dune systems are characterized by various types of wetland that largely reflect the water regime of the site. The outer zone of seasonally flooded swales and the bottom zone of the driest wetland swales are often dominated by phreatophytic shrubs, especially *Baccharis pilularis*, and usually have emergent hydrophytes, such as *Carex praegracilis*, as a dominant understory.

Wetland Type No.: 50.253(26,29.3.554.641.5628)

PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*CHRYSOTHAMNUS NAUSEOSUS*) SEASONALLY-SATURATED OR PHREATOPHYTIC MONTANE FLOODPLAIN AND ALLUVIAL FAN WETLAND. San Bernardino Co., San Bernardino Mountains National Forest, Fawnskin, Highway 38, Baldwin Lake. In the vicinity of Big Bear and Baldwin Lakes in the San Bernardino Mountains, exposed Pleistocene deltas and Holocene floodplains, alluvial fans, and washes support scrub-shrub wetlands that are seasonally saturated or more characteristically phreatophytic and dominated by *Chrysothamnus nauseosus*. This form of alkali scrub is often in the vicinity of seasonal seeps and springs and alkali emergent wetlands in the form of vernal meadows and vernal marshes. It occurs in the context of Jeffrey Pine and White Fir Forest.

Wetland Type No.: 50.253(27.1.385.5627)

PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*PLUCHEA SERICEA*) TEMPORARILY-FLOODED CANYON-RIVER-BANK WETLAND. San Luis Obispo Co., Cuyama River Gorge. *Pluchea*-dominated scrub-shrub wetland occurs on a narrow, undercut bank.

Wetland Type No.: 50.253(28.1.561.5627)

PALUSTRINE SCRUB-SHRUB BROADLEAVED-EVERGREEN (*PLUCHEA SERICEA*) PHREATOPHYTIC RIVER-TERRACE WETLAND. San Luis Obispo Co., Cuyama River Valley. *Pluchea sericea* forms an extensive scrub-shrub wetland on alluvial soils deposited in the lower valley, up-river from the Cuyama River Gorge (Fig. 6, pg. 201).

* * * *

50.000 SYSTEM PALUSTRINE**50.250 CLASS SCRUB-SHRUB WETLAND****50.257 SUBCLASS MIXED DECIDUOUS AND EVERGREEN**

Wetland Type No.: 50.257(24,28.1.480,5623,5624,5625,5626,5721)

PALUSTRINE SCRUB-SHRUB MIXED-DECIDUOUS AND EVERGREEN (BACCHARIS, BRICKELLIA, ISOCOMA, LEPIDOSPARTUM, ERIOGONUM) TEMPORARILY OR INTERMITTANTLY-FLOODED RIVER-CHANNEL-BAR WETLAND. Monterey Co., Big Sur River, Andrew Molera State Park; Santa Barbara Co., Santa Ynez and Santa Maria Rivers; Ventura Co., Santa Clara and Ventura Rivers; San Diego Co., San Luis Rey River. Wetland occurs on bars in channels of intermittent and perennial streams and rivers throughout the study region. Characteristic species include *Baccharis salicifolia*, *Brickellia californica*, *Eriogonum fascicularis*, *Isocoma veneta*, *Lepidospartum squamatum*, *Salix exigua*, *S. lasiolepis* (scrub), *Solanum douglasii*.

Wetland Type No.: 50.257(26,29.1.375,553,5614,5622,5755,5626,5661)

PALUSTRINE SCRUB-SHRUB MIXED-DECIDUOUS AND EVERGREEN (TOXICODENDRON, BACCHARIS, RUBUS, RUBES) SEASONALLY-SATURATED TO PHREATOPHYTIC CANYON-STREAM-BANK AND BOTTOMLAND WETLAND. San Luis Obispo Co., Black Lake Canyon. This scrub-shrub wetland, which often can be dominated by deciduous species, occurs on the margins of emergent and forested wetlands and ponds in canyon bottomlands and stream banks in coastal central California. At sites that can receive seasonal flooding or saturation, the vegetation tends to be characterized by greater cover of *Lonicera involucrata*, *Ribes divaricatum*, *Rosa californica*, and *Rubus ursinus*. At sites that tend to be phreatophytic rather than seasonally flooded or saturated, the vegetation is often dominated by the evergreen shrubs *Baccharis pilularis* and *Rhamnus californica*.

Wetland Type No.: 50.257(26,29.1.853,5614,5622,5691,5743,5755,5766)

PALUSTRINE SCRUB-SHRUB MIXED-DECIDUOUS AND EVERGREEN (TOXICODENDRON, BACCHARIS, MYRICA, RUBUS, SALIX, RHAMNUS) SEASONALLY-SATURATED OR PHREATOPHYTIC DUNE-SWALE WETLAND. San Luis Obispo Co., Nipomo Dunes, Guadalupe Dunes; Santa Barbara Co., San Antonio Terrace, Vandenberg Air Force Base, Coal Oil Point Reserve; Ventura Co., Emma Wood State Beach, McGrath State Beach, Mandalay Beach County Park. This wetland type occurs on margins and in bottoms of dune swales and can be quite rich in shrub species.

Wetland Type No.: 50.257(28,29.1.375,5614,5622,5743,5755,5757,5766)

PALUSTRINE SCRUB-SHRUB MIXED-DECIDUOUS AND EVERGREEN (TOXICODENDRON, BACCHARIS, RHAMNUS, RUBUS, HETEROMELES, SALIX) INTERMITTANTLY-FLOODED OR PHREATOPHYTIC CANYON-STREAM-BANK WETLAND. Santa Barbara Co., Llaga, Mission, and San Jose Creeks. This species-rich scrub-shrub wetland varies considerably in composition in coastal canyons and often is located in riparian corridors between downslope, seasonally flooded forested wetlands and upslope, non-wetland habitats and plant associations. Some classifications might consider this a mesic upland scrub rather than a type of wetland. However, its proximity to obvious wetland obligate and facultative wetland shrubs in many examples, gives support to the inclusion of the wetland into this classification. Characteristic species include *Artemisia californica*, *Baccharis pilularis*, *Clematis ligusticifolia*, *Heteromeles arbutifolia*, *Isocoma veneta*, *Keckiella cordifolia*, *Phacelia ramosissima*, *Rhamnus californica*, *Ribes* spp., *Rubus ursinus*, *Salix lasiolepis*, *Sambucus mexicanus*, *Toxicodendron diversilobum*, *Venegasia carpesioides*.

50.000 SYSTEM PALUSTRINE**50.260 CLASS FORESTED WETLAND****50.261 SUBCLASS BROADLEAVED-DECIDUOUS**

Wetland Type No.: 50.261(22.1.553.5986)

PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*SALIX LASIOLEPIS*) INTERMITTENTLY-EXPOSED CANYON-FLOODPLAIN WETLAND. San Luis Obispo Co., Nipomo Mesa Area, Black Lake Canyon. A broad-leaved evergreen tree, *Myrica californica* (Wax Myrtle), occurs with *Salix lasiolepis* (Arroyo Willow) in these flooded conditions. This wetland is a rare, apparently natural occurrence of a permanently flooded "swamp" wetland that is located in the canyon bottomland at Black Lake Canyon. This forested wetland is part of a rich and regionally unique ecosystem that also supports palustrine aquatic bed, emergent, and scrub-shrub wetlands.

Wetland Type No.: 50.261(23.1.155.5985,5986)

PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*SALIX LAEVIGATA*, *SALIX LASIOLEPIS*) SEMIPERMANENTLY-FLOODED RIVER-VALLEY-RESERVOIR WETLAND. San Luis Obispo Co., Twitchell Reservoir on the Cuyama River, Alamo Creek portion.

Wetland Type No.: 50.261(24.1.211.5821)

PALUSTRINE FORESTED BROAD-LEAVED DECIDUOUS (*PLATANUS RACEMOSA*) SEASONALLY-FLOODED PLATEAU-STREAM-CHANNEL WETLAND. Riverside Co., Ranta Rosa Plateau, Volcano Rd. at Rancho California Rd.

Wetland Type No.: 50.261(24.25.1.382.5921)

PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*ALNUS RHOMBIFOLIA*) SEASONALLY-FLOODED AND PERMANENTLY-SATURATED FOOTHILL-RIVER-BANK WETLAND. Monterey Co., Pfeiffer Big Sur State Park, Big Sur River. *Alnus*-dominated wetland occurs as a row of small trees between the riverine wetlands and needleleaved-evergreen forested wetland dominated by *Sequoia sempervirens* (Coast Redwood).

Wetland Type No.: 50.261(25.1.552.5986)

PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*SALIX LASIOLEPIS*) PERMANENTLY-SATURATED RIVER-FLOODPLAIN WETLAND. Monterey Co., Andrew Molera State Park, Big Sur River. This forested wetland of small trees also is flooded occasionally, but the dominant hydrology that affects the vegetation is one of saturation. The understory is composed of hydrophytes such as *Scirpus microcarpus*.

Wetland Type No.: 50.261(27.1.552.5833)

PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*SALIX LAEVIGATA*) TEMPORARILY-FLOODED RIVER-FLOODPLAIN WOODLAND WETLAND. Ventura Co., Santa Clara River Valley, Santa Clara River at Mayo Crossing. Woodland is dominated by *Salix laevigata* (Red Willow) with an understory of *Urtica dioica* (Stinging Nettle).

Wetland Type No.: 50.261(28.1.251.5912)

PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*ACER MACROPHYLLUM*) INTERMITTENTLY-FLOODED MONTANE-CANYON INVERT WETLAND. Monterey Co., Los Padres National Forest, Mill Creek Watershed. This forested wetland occurs as a narrow row of trees in the bottom of the shallow canyon slope drainage invert.

Wetland Type No.: 50.261(28.1.371.5833)

PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*SALIX LAEVIGATA*) MONTANE-STREAM-BANK-WOODLAND WETLAND. San Bernardi-

no Co., San Bernardino Mountains, Fish Creek Watershed, south of junction of roads 1N05 and 1N02. Along some intermittent streams in the San Bernardino National Forest in the vicinity of the San Gorgonio Wilderness Area, narrow woodlands of *Salix laevigata* (Red Willow) occur in intermittently flooded conditions. This apparently is an uncommon wetland type that is stressed because of the intermittent nature of the streams. The woodlands occur in the context of Jeffrey Pine Forest.

Wetland Type No.: 50.261(29.1.372,562,5711)

PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*PLATANUS RACEMOSA*) PHREATOPHYTIC FOOTHILL-STREAM-BANK AND STREAM-TERRACE WETLAND. Santa Barbara Co., Santa Ynez Mountains, Gaviota State Park and Los Padres National Forest, Gaviota Hot Springs Area. Several tributaries to Gaviota Creek form terraces at this site, providing complex hydrogeomorphic landforms that support various wetlands, including this type of forested wetland dominated by *Platanus racemosa* (Western Sycamore).

Wetland Type No.: 50.261(29.1.532,5941,5981,5986)

PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*JUGLANS, POPULUS, SALIX*) PHREATOPHYTIC RIVER-DELTA WETLAND. Ventura Co., Emma Wood State Beach, Ventura River Mouth. Portions of the delta are sufficiently high in elevation to not be flooded during high water events, whereas adjacent sites of lower elevation are flooded seasonally or intermittently and support different types of forested wetland. Dominant trees include *Juglans californica* var. *californica*, *Populus balsamifera* ssp. *trichocarpa*, and *Salix lasiolepis*.

Wetland Type No.: 50.261(29.1.554,5983)

PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*POPULUS TREMULOIDES*) PHREATOPHYTIC MONTANE-BOTTOMLAND WETLAND. San Bernardino Co., San Gorgonio Wilderness Area, Fish Creek. The San Gorgonio Wilderness Area in the San Bernardino Mountains is the only region in southern California that supports groves of *Populus tremuloides*. These groves have smaller leaves than those to the north (e.g., Sierra Nevada), which results in loss of less water, an adaptation to hot, dry summers. The San Gorgonio population of Quaking Aspen is apparently relictual from Pleistocene time when the region was cooler and wetter than at present. In montane canyon bottomlands, the groves occur in the context of a Needleleaved-Evergreen Forested Wetland dominated by Jeffrey Pine and White Fir. In addition to occurring in these bottomlands, *P. tremuloides* also occurs in small groves along streambanks, such as along Fish Creek.

Wetland Type No.: 50.261(29.1.561,5981)

PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*POPULUS BALSAMIFERA*) PHREATOPHYTIC RIVER-TERRACE WETLAND. Monterey Co., Carmel Valley along the Carmel River, Carmel Valley Rd. at Miramonte Rd.

Wetland Type No.: 50.261(29.1.562,5982,5985)

PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*POPULUS, SALIX*) PHREATOPHYTIC STREAM-TERRACE WETLAND. San Diego Co., Kitchen and Cottonwood Creeks. This forest type occurs on narrow terraces along interior valley streams. Dominant trees include *Populus fremontii* ssp. *fremontii* and *Salix laevigata*. An associated tree is *Quercus agrifolia*, a broadleaved evergreen species

Wetland Type No.: 50.261(29.1.632,5986)

PALUSTRINE FORESTED BROADLEAVED-DECIDUOUS (*SALIX LASIOLEPIS*) PHREATOPHYTIC CANYON-SLOPE WETLAND. San Luis Obispo Co., Black Lake Canyon, Los Osos Creek, Morro Bay at Los Osos. Canyon banks can be dominated by willow forests where the water table is near the surface, particularly where there is seasonal or permanent saturation nearby caused by seeps or springs. In the example used here, there is a rich understory of mesic herbaceous

species but few obligate hydrophytes, which demonstrates the phreatophytic rather than saturated nature of the habitat.

* * * *

50.000 SYSTEM PALUSTRINE

50.260 CLASS FORESTED WETLAND

50.263 SUBCLASS BROADLEAVED EVERGREEN

Wetland Type No.: 50.263(25.1.711.5931)

PALUSTRINE FORESTED BROADLEAVED-EVERGREEN (*LITHOCARPUS DENSIFLORUS*) PERMANENTLY-SATURATED DRAINAGE-HEAD-SEEP WETLAND. Santa Barbara Co., Santa Ynez Mountains, Hollister Ranch. Forested wetland dominated by *Lithocarpus densiflorus* (Tanbark Oak). Largest trees occur in wet soils of a seep and spring and grow upslope from a willow scrub-shrub wetland along the downstream drainage.

Wetland Type No.: 50.263(25.1.712.5952)

PALUSTRINE FORESTED BROADLEAVED-EVERGREEN (*MYRICA CALIFORNICA*) PERMANENTLY-SATURATED SLOPE-SEEP WETLAND. San Luis Obispo Co., Morro Bay, Los Osos Creek, Los Osos. Headland slope-seep dominated by *Myrica californica* (Wax Myrtle) (Fig. 7, pg. 201).

Wetland Type No.: 50.263(26.1.761.5951)

PALUSTRINE FORESTED BROADLEAVED-EVERGREEN (*UMBELLULARIA CALIFORNICA*) SEASONALLY-SATURATED MONTANE-SEEP WETLAND. Santa Barbara Co., Nojoqui Falls, Nojoqui Falls County Park; Ventura Co., North Fork, Matilija Creek at Wheeler Gorge. Clay soils from decomposed bedrock in some mountain canyons may contain seasonal seeps and springs that occasionally support forested wetlands. The occurrence can be either small groves of trees as at Wheeler Gorge or relative large stands of California Bay as at Nojoqui Falls. Associated trees can include *Acer macrophyllum*, *Alnus rhombifolia*, broadleaved-deciduous species, and *Quercus agrifolia*, a broadleaved evergreen species.

Wetland Type No.: 50.263(28,29.1.212,372.5936)

PALUSTRINE FORESTED BROADLEAVED-EVERGREEN (*QUERCUS WISLIZENII*) INTERMITTENTLY-FLOODED AND/OR PHREATOPHYTIC TERRACE-STREAM-CHANNEL AND BANK WOODLAND WETLAND. San Luis Obispo Co., Sierra Madre Mountains, Cottonwood Creek Drainage, along intermittent terrace streams and drainages adjacent to Cuyama Valley. Wetland occurs as a narrow band of scattered trees in a grassland or chaparral setting.

* * * *

50.000 SYSTEM PALUSTRINE

50.260 CLASS FORESTED WETLAND

50.264 SUBCLASS NEEDLELEAVED-EVERGREEN

Wetland Type No.: 50.264(24.1.382.5991)

PALUSTRINE FORESTED NEEDLELEAVED-EVERGREEN (*SEQUOIA SEMPERVIRENS*) SEASONALLY-FLOODED FOOTHILL-RIVER-BANK WETLAND. Monterey Co., Santa Lucia Mountains, Pfeiffer Big Sur State Park, Big Sur River. *Sequoia*-dominated wetland occurs as a narrow band on the riverbank below a palustrine forested terrace and above a narrow band of *Alnus*-dominated forested wetland along the margin of the riverine wetland of the Big Sur River.

Wetland Type No.: 50.264(25.1.716,726.5962)

PALUSTRINE FORESTED NEEDLELEAVED-EVERGREEN (*PINUS CON-TORTA* VAR. *MURRAYANA*) PERMANENTLY-SATURATED MONTANE-SPRING AND SEEP WETLAND. San Bernardino Co., San Bernardino Mountains,

San Gorgonio Wilderness Area; South Fork, Santa Ana River Watershed. Lodgepole pines occur at springs, seeps, and along streams in small groves or narrow bands of forested wetland in a coniferous forest setting. Understory includes grasses (*Elymus* sp., *Poa secunda*), rushes (*Juncus xiphioides*), sedges (*Carex* spp.) and various forbs (*Geranium robertianum*, *Geum macrophyllum*, *Hypericum* sp.).

Wetland Type No.: 50.264(28.1.211,371.5991)

PALUSTRINE FORESTED NEEDLELEAVED-EVERGREEN (*SEQUOIA SEMPERVIRENS*) INTERMITTENTLY-FLOODED MONTANE-STREAM-CHANNEL AND MONTANE-STREAM-BANK WETLAND. Monterey Co., Big Sur River and Mill Creek Watersheds, Los Padres National Forest. Wetland occurs as a narrow band of trees along canyon streams usually adjacent to other forested wetland types (e.g., *Acer-Umbellularia*) or upland forest types (e.g., *Quercus* spp.).

Wetland Type No.: 50.264(29.1.554,5961,5963)

PALUSTRINE FORESTED NEEDLELEAVED-EVERGREEN (*ABIES*, *PINUS*) PHREATOPHYTIC MONTANE-BOTTOMLAND WETLAND. San Bernardino Co., San Bernardino Mountains, San Gorgonio Wilderness Area, vicinity of Fish Creek near Rd. 1N05. The San Gorgonio Wilderness Area in the San Bernardino Mountains is the only region in southern California that supports groves of *Populus tremuloides*. In montane canyon bottomlands, the groves occur in the context of this Needleleaved-Evergreen Forested Wetland dominated by *Abies concolor* and *Pinus jeffreyi*.

* * * *

50.000 SYSTEM PALUSTRINE

50.260 CLASS FORESTED WETLAND

50.267 SUBCLASS MIXED-DECIDUOUS-AND-EVERGREEN

Wetland Type No.: 50.267(27.1.371,5912,5936,5971)

PALUSTRINE FORESTED MIXED-DECIDUOUS-AND-EVERGREEN (*ACER*, *QUERCUS*, *PLATANUS*) TEMPORARILY-FLOODED MONTANE-STREAM-BANK WETLAND. San Luis Obispo Co., Sierra Madre Mountains, Cottonwood Creek Drainage. Wetland occurs as a narrow band along montane streams. Dominant species include *Acer macrophyllum*, *Platanus racemosa*, and *Quercus wislizenii*.

Wetland Type No.: 50.267(27.1.371,5921,5933,5963)

PALUSTRINE FORESTED MIXED-DECIDUOUS-AND-EVERGREEN (*ALNUS*, *QUERCUS*, *PINUS*) TEMPORARILY-FLOODED MONTANE-STREAM-BANK WETLAND. San Diego Co., Headwaters of the Sweetwater River, Cuyamaca Mountains, Cuyamaca Regional State Park. Dominant species include *Alnus rhombifolia*, a broadleaved-deciduous tree, *Quercus agrifolia* var. *oxydenia*, a broadleaved-evergreen tree, and *Pinus jeffreyi*, a needleleaved-evergreen tree. Wetland type occurs as a narrow band along streams within a *Pinus jeffreyi* forest. Often characteristic species include *Platanus racemosa*, a broadleaved-deciduous tree, and *Calocedrus decurrens*, a needleleaved-evergreen tree.

Wetland Type No.: 50.267(29.1.632,634,5912,5951)

PALUSTRINE FORESTED MIXED-DECIDUOUS-AND-EVERGREEN (*ACER*, *UMBELLULARIA*) PHREATOPHYTIC CANYON AND MONTANE-SLOPE WETLAND. Monterey Co., Mill Creek Watershed. Wetland occurs as small groves of trees on slopes above montane canyon streambanks and often adjacent to upland forests of *Quercus* spp.